



Etiology of Alveolar Suppurations.

By Dr. W. H. BIRCHMORE, Brooklyn, N. Y.

Suppuration anywhere is sufficiently annoying, but when it seats itself, or the figured elements of its causation, to speak more accurately, seat themselves at the root of a tooth, it is, judging by a personal experience, simply—let us say that it is very interesting. Not only is the congeries of symptoms interesting by reason of the pain and nervous disturbance, so utterly out of all proportion to the pathological importance of such a lesion, considered from the surgeon's standpoint, but the symptom picture finds an added interest in the views which find expression in professional writings. Formal treatises on pathology and casual contributions to the journals alike give evidence that either the lesion has not been studied scientifically, or that the men who write having, it is presumed, studied it properly, refrain from drawing the conclusion logically obviously necessary from the premises which they so fully discuss and so accurately state.

When a man is suffering from suppuration in the neighborhood of his teeth he is not inclined to philosophy nor to much thinking, either logical or otherwise, and yet when the pain has been banished by the ministrations of the skilled surgeon it is not the act of a wise man to say "This matter is finished; there is no need of further thinking." The opposite indeed is true. The victim of such a mischance should do his best to clear up the questions involved, since by so doing he may certainly lessen the burden of his brother man and very possibly his own. This is my reason—shall I say, rather, my excuse?—for adding yet another paper to the literature of this already too much written subject. There is no lack of literature, such as it is, and there are a few papers in the professional journals, and a very few chapters in the formal treatises on surgery which

seem to contain all the facts needed for an exhaustive study and its logical expression. Yet the views promulgated are utterly illogical, as a *corpus doctrinae*, and self evidently futile as a working hypothesis. Each writer seems to set himself the task of explaining some one phenomenon, while he conscientiously neglects to discuss any of the dozen and five others equally *bizarre*.

The views held by the various writers may be classified, judging by their printed words alone, much as follows:

**Etiology of
Alveolar Abscess.**

(a) It is a disease of nutrition. This view regards the fact of suppuration as the chief symptom, and considers it of value as an evidence that the general health of the patient is in a bad way and

thus only.

(b) It is a local manifestation of a widespread disorder of the blood. First, the influence of the suppuration bacilli is acknowledged, but it is held to be secondary; the condition of the blood is given first place. The contention is made that if the blood were in proper condition, phagocytosis would relieve the focus and all would be well. Secondly, this view also recognizes the influence of the suppuration bacilli, or rather perhaps cocci, but at the same time holds the blood to be the true locus of the disorder. It contents itself with saying that "in this condition of the blood any trifling injury becomes a focus of suppuration." There again the blood is called into the discussion of causes, and it is held "that the condition of the blood is the first cause of disease." Third, this view implies that the suppuration cocci are at all times present in the blood, that the phagocytes are always engaged in destroying them, but in this case in some way the villains always escape the policemen.

(c) In this version seldom held and still more seldom voiced, some one dares to say that the cocci are intruders from outside, and the suppuration is the body's battle to expel the invader.

In nearly every paper which I have read, and in nearly every book which I have seen which had any pretence of value at all, I have found the same state of things. Either an implication that the invasion of the cocci was from the side of the blood circulation, or a complete negation of the causative relation of the cocci. In every case but one the final fault stands charged against the blood as a sin of omission or commission.

Against this view are many and weighty objections, which seem to me to amount to a demonstration that the conclusion logically necessary from the facts of the case now in the hands of the profession should be without hesitation drawn, and should be promulgated without regard to the reputations of those who think unreason.

We find on every side the hypothesis that the diseased action finds

origin in a condition existent on what may be called the blood or the circulation side of the tissues, treated as an axiom. The utmost claim which can be granted is that it is a mistaken postulate.

**Causes of
Suppuration.**

Again and again, and yet a third time, the surgical profession at large has insisted that there are many forms, causes and occasions of suppuration, but one by one these have been eliminated until it is now possible to say positively that no form of suppurative disease exists in which the immediate cause and agent is anything else than one or the other of certain figured elements, probably all of them vegetal in origin and nature, only one now remaining in doubt, that of the suppurating disease called smallpox, in the vernacular; and the pathologists have carried their studies to the point at which, given the suppurative disease, they can tell almost at sight its cause, and they have figured and experimented with these causes until they can tell just what form of suppuration will follow if a given species of microphyte is inoculated upon an animal body, be it in a condition of health or in a condition of reduced vitality. So far have these studies gone that we can say beyond a doubt or question, "without these foreign figured elements, these vegetal intruders, if you will so regard them, there is no suppuration, there is no pus."

It may be possible to say even more and yet to keep within the bounds of most rigid scientific truth; to say, "Not only does suppuration never occur without these figured elements, but no definable form of suppuration ever occurs without its definite figured element."

No pathologist skilled in modern culture, unless one professing a fad for the sake of an all too filthy lucre, and to the shame of the profession there are such, will for an instant dispute this statement, and those who do dispute it are led to do so by ignorance, or shall I say lack of opportunity for study, or by a desire for notoriety, a species of monomania as pitiable as its relative the monomania for greatness.

Among the forms of suppuration caused by known and named figured elements is the very disease in question for which I believe the most apt word "cementitis" or "pericementitis" has been coined.

Had I no further object in view than to simply state the case, my purpose would be subserved by saying, "While clinically I know next to nothing about the separation of these three forms of disease, and my knowledge in this clinical bearing is wholly at second hand, for I am no clinician, that which I do know as a pathologist from the study of specimens sent to me for examination, accompanied with memoranda of clinical details for my further enlightenment, enables me to say most positively that the three congeries of symptoms, which I have referred to, do actually exist well and sharply defined, and also a fourth one, but

this is less clearly marked. As to the clinical distinction answering to the pathological one, there is not the smallest doubt whatever."

Logically, there should be two other forms in addition to these three, as will appear later, and undoubtedly they exist; but it may be that by reason of their extreme infrequency, or because the study made is insufficient, they remain in the undefined haze which surrounds the whole question clinically, as yet but indistinctly seen.

It is utterly useless to discuss the question, "Is suppuration in general caused by the figured elements known as the suppuration schistocytes?" because those who decline to believe it are those, and only those, who are either wilfully, or as the church says "invincibly" ignorant. The present question, the question seeking elucidation today, is this: "From which side of the plane of disease, speaking pathologically, does the diseased action come?" Many writers and teachers seem to think "from the circulation side." Let us examine the reasons for accepting or rejecting this hypothesis.

**Relation of
the Blood
to Suppuration.**

If it be true, it requires that the suppuration's cocci be circulated in the blood before the manifestation of the diseased action, and that the provision existing for the capture and destruction of such intruders in this case should be either non-existent or a failure. The objections to this theory are insurmountable. In the first place we know what the congeries of symptoms are when the suppuration's cocci make their way and growth in the blood against the efforts of the phagocytes, the body's standing army always on the alert against invaders.

Such congeries of symptoms are those which we call pyæmia, suppurative disease of the liver, which is always accompanied by other and corresponding lesions in other parts of the body, diffuse tuberculosis, the dreaded variola and the like. Even the disease which we have now learned to call "furunculosis," and which sometimes so curiously mimics smallpox both in symptoms and results that men have mistaken the diagnosis, is not a blood disease with a local expression, but an invasion from outside; and although it is sometimes followed by terrible secondary consequences, these are distinctly septic, distinctly the results of chemical poisons elaborated on the surface of the body and there absorbed. No discussion is needed to show the difference between these diseases, between pyæmia and the disorder under discussion, either as to their anatomical seriousness and the influence which they exert, by the permanent lesions left behind after convalescence, on the after life of the unfortunate victim.

It will be urged that certain men are teaching that various cocci and bacilli can at any time be found in the blood by cultivation experiments,

and also all that is needful to establish a "focus" is a "weak spot," a "something in which these figured elements may have found a nidus for the reproduction of their kind;" given this nidus, say these teachers, and the deed is done, suppuration begins at once. This teaching was the current orthodox belief fifteen or twenty years ago, and some men may still believe it (may the good God pardon them their sin), but for the student fraction this theory has been dead and buried for years; indeed it was refuted almost before it got outside the laboratory in which it was formulated; it proved too much; it was utterly untenable; it was logically impossible. In almost any specimen of blood obtained by pricking the skin, phagocytes can be found with cocci and bacilli within them, but the cocci are not ruffians at large; they are but arrested peace disturbers in the police band wagon, to be unceremoniously dumped out on the surface of the intestinal tract if they live long enough, to be thrown on the body's dust heap if they die.

**Abscesses on
Living Teeth.**

I have before me as I write a monograph by one of Zeigler's pupils, in which this very form of suppuration, that at the base of a tooth apparently sound, is used as an illustration, and in a way as an argument to show that the cocci of suppuration must come from the circulation's side. But his argument fails, being based on fallacy. In effect he says, "Since we cannot show that these bacilli come from the ectoderm, and they certainly came not from the endoderm, we must admit that they came from the mesoderm, that is, from the blood vessels." This is wrong in logic to begin with. It is based on an assumed ultimate knowledge, one might almost say that he predicated it, which knowledge as a matter of course he did not and could not have; and its assumption that the structures surrounding such a tooth are really sound, that they are really existing in ideally perfect conditions because he cannot prove the opposite, is absurd.

Many men who write, and some men who actually think before writing, which most men do afterwards if ever, are altogether too prone to use the word "physiological," especially when coupled with the word "condition," as though it were an expression of an actual instead of an ideal state. Were conditions ideal, disease would long ago have been a tradition simply. In fact, physiological only means that the conditions are not incompatible with usefulness.

Granted that the tooth does seem perfectly normal, who is there who shall change the words "does seem" to "is;" who can know enough of any tooth to say "it is perfectly normal?" Or while, as now, the word "normal" only means agreeing with the usual appearances and observations, to change this word to "ideal," or to use this word "normal" as

equivalent therefor, yes, even in his own most inmost thought, let alone his words? A tooth which in every way agrees perfectly with the usual appearances, and has even been asserted to be perfectly normal, has once and again deceived the most skilled specialists as to its real condition, both as to the matter and the manner of disease, as all men know too well.

I think that we may safely use greater modesty of diction, as well as greater accuracy in our choice of words, both in the thought and its statement in discussing both physiological and pathological processes.

To bring the matter to its final expression, it is my contention that not one scintilla, not one little sparklet of scientific evidence, evidence so guarded against error that it cannot be gainsaid, has ever been brought forward to show that abscesses in the neighborhood of the teeth are caused by suppuration-schistophytes circulating in the blood, and that all analogy and experience, if that counts for anything, considering what the experience of most men really amounts to, are both alike against it. If men, so many men, have died and worms have eaten them, but not for love, just how many teeth have died and their entire axial structures been softened and destroyed, and even had amorphous centers built up by repair processes without one suggestion of suppuration, although in some few cases evidences of inflammatory disease have been found on examination post mortem? The clinician with his experience may say "not any," but the pathologist with his specimens will say "legions."

Were the suppuration cocci roaming the blood in search of places in which to fix their homes, this could not be, nay verily, our bodies would be simply bodies of corruption in a sense by no means so poetical as St. Paul's thought. But as I have said, they are not so roaming; the few, and they are very few, which escape the policemen on guard, are caught immediately by the huge multitude of the phagocytic cells and never get a chance to reach a place in which they might make trouble. Entering the body by way of the skin, lungs, intestines by myriads every day, how many are there living long enough to carry out their evil will? Yet trouble sometimes, far too often for our comfort, comes; if not by way of the blood, then some other way, but how? Is the explanation not in order?

Most certainly it is. The pathology of the suppuration process in relation to the teeth, for such in fact is the question really demanding attention, is one so beclouded that it is difficult to begin in just the right place, but the first thing to be remembered is that teeth are in fact dermal appendages paralogous of the nails and hair, and in seeking for the pathological analogies we must look to the nails and hair rather than to other structures, and in the inflammatory disorders of the hair follicles we really find the nearest analogies to the periodontal suppuration.

It is useless to discuss the cause of suppuration. Every one now

knows what it is, but it may be worth while to mention that in the life history of every coccus form there are many periods, during two of which it is distinctly motile. One when previous to encystment the cell contents are making a journey as an amoeba, the other when, freed from the enclosing cyst, the young plants are free swimming "spore-like bodies." The life history of these microphytes is not nearly so well known as it should be by all who have to deal in thought or act with them and their results in daily life. With this as the reason for so doing, let me go over the life history and life's work of these organisms.

**Life History of
Microorganisms.**

Most men who see these bacilli do so in stained specimens mounted in balsam, as it were a part of a cabinet of curios, and it would seem from pictures and written descriptions that even those who professionally claim an intimate acquaintance really know them only in one stage of their life history as exhibited in one culture medium and one only. The examination of these beautiful slides with an oil immersion is a very pleasant way to pass an idle hour, but as an attempt at serious study it is much belated.

If the balsam mount is carefully stained by Gram's method, and most probably it is, all that the eye can detect even with the best objectives will be something less of depth of color in one coccus than in another, but if the staining is not too deep and is otherwise unusually successful, it will be seen that the cocci are not all alike and that some have no cell contents. If, however, the cocci were grown on the cover glass in gelatin faintly tinted with "life blue," we see that the cells which were found empty in the balsam mounted slide were the empty membranes of cells which had been evacuated, and it is quite likely that even while we are looking at and examining the slide, another one will break and with some speed evacuate its cell contents, and if the magnification is sufficient and the lenses equal to the best, it will be seen that the cell contents thus evacuated is an amoeba containing granules, and these granules stain bright blue.*

This culture has been made in artificial saliva, as well as in other culture fluids, and here also this process of the evacuation of the cell contents and its independent amoeboid life is well seen, and it will be noted that the activity of the amoeba is relatively great, and at length one comes to understand that so small and so active a being must be able to reach to many unexpected places, and to some which would hardly be thought of as accessible to them. After a greater or less period of amoeboid existence the amoeba is encysted, obtains a shell more or less protective,

*This word amoeba is used to express a body form, not any definite animal. The use implying a generic or specific meaning, however permissible a century since, is not so now.

and after a time discharges a number, at least more than twenty-five, and it may be more than one hundred granules, which at first are also motile. These in their turn develop into spheroidal cocci, grow into chains and renew the cycle.

Such being the life history, it is no particular wonder that this coccus group, for apparently all the suppuration cocci alike fulfil this cycle, is found in many *bizarre* and unlooked for situations. In situations which at first seem unaccountable, but which after reflection and a second thought are quite deprived of their element of impossibility and unexpectedness; they cease even to seem new.

This life history probably belongs in general to all the figured elements called "micro-cocci," really diminutive algæ without leaf green, found in a causative relation to the inflammation processes, of which we certainly now know and recognize three species and no more.

These three species which have been found in causative relation to the suppurative processes at the roots of the teeth are, judging from a careful study of both the specimens themselves, cultures mountings and clinical histories, so far as these were accessible, as follows:

**Micro-Cocci
of Suppuration.**

1. A coccus whose cultures are white, as is also the pus.
2. A coccus whose cultures are almost orange, while the pus is distinctly yellow.
3. A coccus whose cultures are cobalt blue, while the pus is a faint blue.
4. A combination of 1 and 2. Clinical picture not identified.
5. A combination of 1 and 3. Clinical picture is not identified.
6. A combination of 2 and 3. Clinical data conflicting, almost contradictory.

The details of these clinical pictures are not given here, as they are not in the premises germane. It is sufficient to say that the one producing the most trouble is the one listed as 2, than which 1 is found more frequently in those cases where the suppurative process is either just below the border or line of contact between gums and teeth, while 2 is more often found in deep abscesses, such as those which discharge through the pulp canal. The one given as 3 seems to be implicated in the most trying of all suppuration cases. One of my correspondents who has sent me pus from a number of abscesses, which he sees fit to call blue-green abscesses, says of it in his last letter: "I am coming to look upon this pus as a sort of hoodoo. Since you warned me about it, I find it more frequently than I did, and I find such abscesses particularly hard to cure. They have a way of refusing to heal, a sort of recrudescence habit, which is trying to my nerves."

According to his letter, he has found the white and yellow pus in the pulp cavities of normal teeth (sic!), but he has never found the pus of a greenish hue unless the teeth had obviously decayed. Another correspondent says: "I have seen pus with a green to greenish hue many times, but never so distinctly green as this, in which the tooth was seemingly quite normal." (Sic!) It must not be forgotten that every one of these figured elements can be found in mouths which the most careful examination affirms to be healthy, found not enclosed in phagocytes, but in full functional activity ready to take any advantage or opportunity offered to them for getting in their work, for entering on their seeming predestined vocation and exciting suppuration.

**Method of Invasion
of Micro-Cocci
Into the Tissues.**

It remains to show how this is done. In forensic logic a case is considered as proved if it is shown that John Doe had the intention of burglary, if he is found in a house where he had no business to be, with the silver spoons in his pocket. Presumably the same logical conclusion may be drawn in this case, but it must be shown that the cocci had an opportunity for reaching the base of the tooth from the oral as opposed to the vascular side. It has been explained that at two periods of their lives these cocci are motile, the amœba is less in bulk than the coccus, say one five-hundredth of the bulk of a colorless blood body, and it would take more than one hundred of the sporule bodies to make one amœba, hence the inference that they are small in very deed as compared with a blood corpuscle.

The line of contact between the gum and the teeth is not so close as to hinder such a creeping, crawling thing as an amœba is from making its way, nor could such a crawling creeper have any difficulty in getting about among the tissue elements when such a giant as a white blood body can go about with comparative ease. Cross sections of the tissues in the neighborhood of the site in which suppuration occurs show that the tissue is less dense than many through which lymph corpuscles go without difficulty, and the lymph corpuscles are often found in the pericementum. That such cocci do in point of fact make their way into this structure is an observed fact, for I have seen a slide in which was distinctly visible a phagocyte containing eight of these cocci which it had seemingly just gathered in and had now in safe custody, and in this specimen between the gum and tooth was a depot of cocci just beginning to set up an inflammation. This tissue is peculiarly well fitted for such an invasion from the mouth. Amœboid bodies of such small size can readily find their way even to the very opening of the pulp canal at the very root of the tooth by keeping to the connective tissue bundle layer just outside the line of cells adjacent and in contact with the distinctly cellular layer in contact

with the teeth. So compact is this connective tissue that white blood bodies move about in it with difficulty, but the amœboid cocci from their minute size would find it an easy way.

Granted then that the amœba form coccus has a convenient locus for its work, what happens? First of all the coccus encysts itself and becomes quite inert, motionless, quiescent; the disturbance it has made, if it had made any, which is doubtful, decreases to the vanishing point. How long it can remain latent and concealed we do not know, but long enough for its needs no doubt. Then comes the second motor stage, and as there is no opportunity for its exercise, it is of course abridged and the spores begin to develop all in a bunch. Then there is a first class disturbance, and cell proliferation goes on rapidly. It is a wrong kind of growth for the needs of the tissues, but it is the only one the cells around are equal to; stimulated they grow; the development is short lived, for the very growth cuts off the blood supply by mutual pressure. No better opportunity than this for the cocci can be imagined, surrounded by cells of lowered vitality, some dead, some dying, they feed to absolute repletion and increase accordingly, extending the depot in all directions, so rapidly indeed that by the time the tissues can take on any systematic defense the trouble has grown too great for cure by any means short of actual suppuration. A line of demarcation is made in the tissue, the scavenger cells enter the focus, and the formation of pus begins. While certain cells prepare a road for exit of the army which has made captive the invaders, the nerves of course are suffering, as are the other tissues, the increasing pressure causes pain, and a painful swelling results. When the road has been opened, the scavenger army and their captives—that is, the pus and broken down tissues—are evacuated, repair processes begin, and soon the hole is filled by the cicatrix.

Such is the process of invasion and defense as shown by observation and study. The blood has no connection with the process save only incidentally in the fulfilment of the task laid upon it, the defense of the tissues. It is then a matter of observation that the invasion is from the oral side of the plane of contact, not from the vascular side. The blood conditions antecedent to suppuration are those which belong to health, to vital action. The blood's condition before the suppuration was *ad hoc* healthy; during the diseased action in the tissues the blood's action was for and towards the restoration of normal conditions.

To maintain that the condition of the blood is the cause of suppuration is equivalent to saying that the court which tries a man for stealing, made him a thief. To repeat and insist as some men are doing that the peridental phlegmon is a manifestation of a dyscrasia, is equivalent to saying "The lessons which have been learned during the last thirty years by that portion

of the profession which sees, studies, thinks, are lost on me; are lessons which I will not learn, as by not learning them I become notorious among my fellows, even if such notoriety is an omen of injury to my patients."

I know that to the greater number of my readers these facts, it may be, are a twice told tale. Some will not be displeased that they have heard them twice, and if any feel that they should have been spared the infliction, I trust the importance of the subject will secure my pardon.





The Band and Dowel Crown.*

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IX.

(Continued.)

Repairing and Removing.

(Repairing: Replacement of Facings; Usual Method, Procedure. Brewer's Method; Application. Underwood's and Mitchell's Method; Application. Dwight's Method; Application. Bryant's Method; Application. Replacing Bicuspids and Molar Facings. Replacement of Facing and Backing; Procedure. Removing: Use of Excising Forceps, Separating Cap and Dowel.)

Because of the presence of porcelain, and the consequent more or less frequent occurrence of fractured facings as a result of accident, inadequate protection, or faulty articulation and occlusion, as well as for the purpose of replacement or substitution, it often becomes necessary to repair this style of crown, or to remove it from its attachment to the root.

Repairing.

The presentation of fractured or broken facings on crowns and bridges constitutes a large per cent of the failures requiring such attention, and where the work remains otherwise in good condition, and is secure in its attachment, repair may be effected in an artistic manner by replacing the facings without removing the piece.

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**Replacement of
Facings.**

In the replacement of facings, several good and reliable methods are employed, but a selection of the best or most desirable one will depend much upon the construction of the work and the requirements of the case, as well as the individual preference of the operator.

When such a procedure is indicated, where the work has been constructed by the ordinary method, all remaining particles of porcelain surrounding the pins should first be broken and removed. This can be quite easily accomplished with excising forceps, cutting pliers or chisels, after which the projecting pins should be cut away and ground down flush and even with the surface of the backing, with a sharp, round, or oval, plain, or plug-finishing bur.

Usual Method.

The method usually and, perhaps, most commonly employed consists of securing the attachment of the replaced facing by simply bending or clinching the pins upon the lingual surface of the backing.

Procedure.

In this procedure a facing of the required size, shape and color should be selected, and the backing then properly perforated to admit of its adjustment.

The accurate position of the perforations may be easily ascertained, and designated, by first coating the surface of the backing with a *thin* film of melted wax, and then pressing the ends of the pins into it, after noting that they have been made *parallel with each other*, and that the facing is held in its proper relation to the backing and adjacent teeth or facings.

When the exact location has been thus, or similarly, designated, the perforations may be made with a small spear-pointed drill, and subsequently enlarged to the proper proportions to receive the pins with a round or fissure bur, or twist drill, of corresponding diameter. While they should be large enough to readily admit of the reception of the pins, the fit should be sufficiently close to render the attachment secure, and preclude the subsequent loosening of the facing.

The facing should be then adjusted to position and ground to fit the backing, and to meet the requirements of length, occlusion and alignment; and this may often be somewhat facilitated by bending the incisal or occlusal edge of the backing, with pliers, until a more favorable shape presents.

When the adaptation has been completed, it should be noted that the pins extend through upon the lingual surface sufficiently far to admit of securing a firm attachment by bending their surplus ends; and in the event of this being prevented by the thickness of the backing, its lingual surface should be previously ground down with small carborundum stones, or burs, until such security is made possible.

The surfaces of the facing and backing should then be thoroughly cleaned, slightly roughened and dried with alcohol or chloroform, when the backing should be covered with cement mixed fairly stiff, and the facing adjusted to position, where it should be held *firmly* while the ends of the pins are being bent over upon the backing with pliers.

Moisture should then be excluded from the cement until it has thoroughly crystallized, when the edge of the backing should be finished down close to the porcelain, with disks, and the pins *flattened* with small stones until presenting a more or less smooth and continuous contact with the backing. The latter may usually be done to the best advantage, and with the least danger of fracturing the cement, at a subsequent sitting.

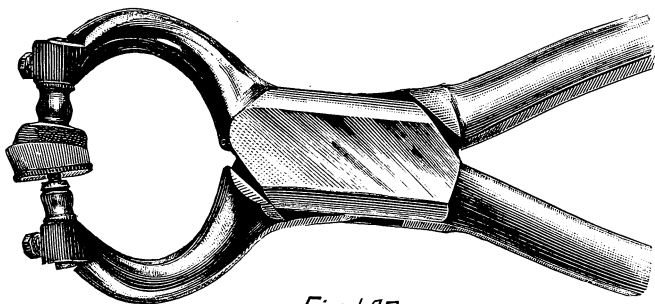


Fig. 147.

Brewer's Method.

The above procedure is much simplified and greatly facilitated by the use of a pair of "*riveting forceps*," designed for the purpose of riveting the ends of the pins down close upon the backing, by Dr. Frank A. Brewer, Sr., of King City, Cal. (Fig. 147.)

One beak of these forceps presents a corrugated soft rubber pad, on an adjustable joint, which admits of its close adaptation to the facing at any angle or position, while the other presents a small concave steel point, also likewise adjustable, which engages the end of the pin.

In the application of this method of attaching the facing, the perforations should be made and the facing adapted, as indicated, and then the ends of the pins or the backing should be sacrificed until the former project *only* about $\frac{1}{32}$ of an inch beyond the surface of the latter.

The lingual surface of the perforations should now be somewhat countersunk with a round bur of proper size used in a right angle hand-piece.

When the facing has been well adapted, it should be placed in position with, or without, cement, and the forceps then adjusted, when a slight

pressure upon the handles consecutively applied during a rotary or swinging movement of the arm will effect an expansion of the diameter, and a compression of the heads of the pins, until a very secure and finished attachment results, with little or no danger of fracturing the porcelain.

Underwood's and Mitchell's Method.

The method advocated by Dr. C. J. Underwood, of Elgin, Ill., which in similar detail has also been employed for a number of years by Dr. Wm. Mitchell, of London, England, is also valuable and useful, and is particularly applicable to those cases where the old backing was originally, or has been worn down until, too short to afford the proper protection to the porcelain along the incisal or occlusal edge.

This method consists of adapting a duplicate backing to the lingual surface of the old backing, and then attaching it to the pins of the facing with solder, and, wherever the occlusion will admit, its application may be made with very artistic results, and with a maximum of strength.

In the procedure incident to the application of this method, the remaining porcelain and projecting ends of the pins should be removed from the old backing, and *slots* or *grooves* sufficiently wide to accommodate the pins

Application.

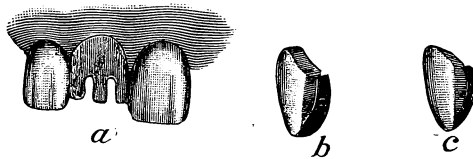


Fig. 148.

of the new facing and extending from the incisal or occlusal end toward the cervical to a point which will admit of its proper adjustment, should be made with a cross-cut or plain fissure bur. (Fig. 148 A.)

The location of these grooves may be accurately designated, as previously indicated, and the bur used should be of a diameter as similar to that of the pins as possible.

The facing selected is then ground to the required and desired adaptation, and afterward backed up with pure gold, about 34 gauge. This should be well adapted to the incisal or occlusal end of the facing, and trimmed to closely follow its outlines. The *cervical* edge of the backing should be then drawn away from its contact with the porcelain toward the extreme ends of the pins, so as to *straddle* or pass to the lingual surface of the old backing.

Facing and backing should be then adjusted to position on the crown or bridge, and the latter burnished to a close conformation with the lin-

gual surface of the old backing, which, if too thick to allow the pins to project slightly through the new backing, should be ground until admitting of same. (Fig. 148 B.)

While it is best to secure this adaptation directly in the mouth, it may also be accomplished with reasonable accuracy by taking an impression of the crown and adjacent teeth, after the grooves have been cut, with gutta percha, and obtaining from it a *fusible metal* working model for the purpose.

The adaptation should then be sustained by the use of wax or temporary stopping, and the facing and backing gently detached, and invested with sufficient care to insure the thorough penetration of the investment material into the intervening space between the two.

The relation should now be permanently sustained by soldering the backing to the exposed ends of the pins, and then re-enforcing it as much

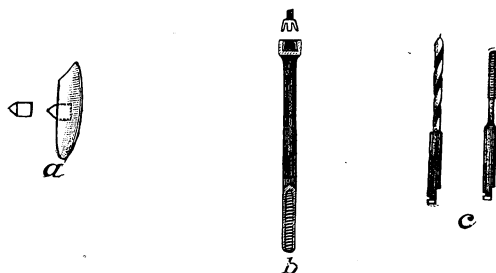


Fig. 149.

as the occlusion will admit, after which it should be finished and polished (Fig. 148 C.) and then mounted with cement.

While the detail of this method is necessarily somewhat circuitous, the procedure affords a most secure and finished result.

Dwight's Method.

Dwight's method, which has been previously mentioned and illustrated in connection with replaceable and detachable facings, is also applicable to the repair of work where the ordinary two-pin facing has been used.

When the remaining porcelain and projecting ends of the pins have been removed, a facing of this particular style should be selected and ground to place, in which the procedure is facilitated because of the absence of any pins.

After the proper adaptation has been secured, the "finder," which is included among the necessary instruments for doing this special work, and consists simply of a base or shank which fits into the socket in the fac-

ing, and tapers to a central point, should be adjusted to position. (Fig. 149 A.)

This affords a means of designating the exact location for a single perforation in the old backing, by applying sufficient pressure, or by the use of a thin film of wax, with the facing held in its proper relation.

A *small* perforation should first be made at this point with a drill or round bur, and this then suitably enlarged with a twist drill, and subsequently threaded with a tap, both of which are also included in the outfit. (Fig. 149 B.)

The threaded shank of the "*attachment*" should be now adjusted to the "holder" (Fig. 149 C.), and screwed into place until its base rests firmly against the backing, and the spring ends are brought into proper position to engage the facing. If the latter is impossible at the first trial, the attachment should be unscrewed and removed, and the backing immediately surrounding the perforation ground away.

By this means the threaded area may be consecutively diminished until the required relation is obtained, after securing which the projecting end of the attachment upon the lingual surface is ground down even with the backing, and the facing then mounted with cement.

Bryant's Method.

Among the most ingenious methods used in replacing facings is the one devised by Dr. Emory A. Bryant, of Washington, D. C. This consists of countersinking the old backing from the lingual surface; then threading the pins of the facing, and attaching it to the backing by means of a corresponding countersunk nut.

The latter are procurable in ready-made form, as are also the necessary instruments for doing the work, and while this method affords a secure means of attachment, the detail is somewhat exacting and requires considerable time.

It is perhaps more generally applicable to replacing facings on bicuspid, or even molars, in bridgework, than to the anterior teeth, because the strength of the attachment increases, of course, in proportion to the thickness of the backing, which in this particular region is necessarily governed by the occlusion, yet it may often be applied here.

In the application of this method, the remaining porcelain, and projecting ends of the pins, should be removed, the new facing selected, and the backing accurately perforated for the reception of the pins, as previously indicated; after which the facing should be ground to the required adaptation.

The perforations in the backing are now countersunk from the

lingual surface with the countersinking reamer in right angle handpiece, until they are suitably enlarged to receive the small end of the nut and admit of bringing it flush and even with the labial or buccal surface of the backing (Fig. 150 A.), *care being observed that it shall not protrude to the least extent.*

When this has been accomplished, the pins of the facing should be threaded, first with the large size die, or screw-plate, and finally with the smaller one; in which procedure care must be exercised to prevent twisting off the pins. The use of a little oil will preclude this and facilitate the work.

The nuts are made of a well alloyed gold, corresponding in size with the reamer, and are *tapped* to fit the threaded pins of the facing, to each of which the respective nuts should be first adjusted to place, before the permanent attachment of the facing to the backing is made.

The backing should then be coated with cement, the facing placed in position and the nuts adjusted to the pins (Fig. 150 B) (which may be

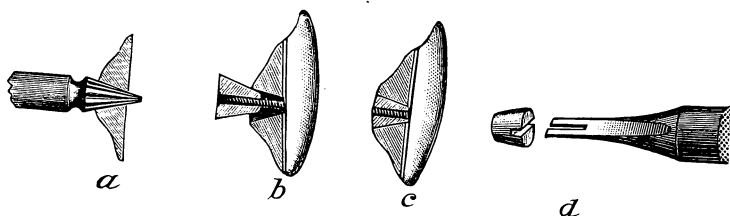


Fig. 150.

facilitated by a "holder"), and *alternately* screwed to place with the wrench, avoiding undue force, until both are firmly fixed in their proper relation and the attachment is secure.

The projecting ends of the nuts and pins should now be ground down, with small carborundum stones, until smooth and continuous with the backing, and the surface subsequently polished with disks. (Fig. 150 C.)

The nuts, and a wrench, suitable for their adjustment, are illustrated in Fig. 150 D.

Replacing Bicuspid on Molar Facings.

The replacement of facings on bicuspid and molars, although perhaps most generally confined to bridgework, will be also considered in this connection. This is usually a somewhat more difficult procedure, because of the increased thickness of the gold forming the cusps and lingual contour, and surrounding the area where the attachment must be secured, which usually precludes a projection of the ends of the pins.

Where it may not be desirable to employ the Bryant method, or where the same may seem contraindicated, or be impracticable, the most simple and commonly applied procedure is to cut a countersunk aperture in the old backing with drills and burs, of proportions sufficiently large to admit and accommodate both pins of an ordinary facing.

The facing should then be selected and ground to the required adaptation, and the ends of the pins bent somewhat diverging from each other, or to present short sharp right angle turns, which may be passed into the aperture when the facing is slightly inverted, and which will hook over its edge upon bringing the facing into proper position.

This will increase the integrity and strength of the subsequent attachment with cement, and the same may be further facilitated by serrating or roughening the surface of the backing with a sharp wheel or inverted cone bur.

Facing and backing should now be thoroughly dried, and the mounting made with cement mixed fairly thick, and with an observation of the previously mentioned details in this connection, reasonably permanent results may be obtained.

Where adequate mechanical retention is possible, plastic amalgam may often be used to good advantage, and is sometimes preferable to cement.

In those cases where the old backing has been almost, or entirely, destroyed, so that sufficient opportunity for securing adequate anchorage for a new facing, by any of these methods, is doubtful; or where the cap and dowel have become detached from the root, or may be removed without mutilation or destruction, repair can *almost invariably* be *best* effected by cutting the remaining backing off close to the base of the cap with a fine saw, excising forceps, carborundum stones or files, and attaching the facing and its new backing by *investing and soldering* in the usual manner.

The mechanical saw (Fig. 151) will usually be found best adapted to such purpose, and is an indispensable device to a well-equipped laboratory.

This procedure will afford opportunity for securing the strongest and most artistic results wherever the adaptation between cap and root is sufficiently good to warrant the use of the old cap, and where this is doubtful, a new crown should be constructed throughout.

In such instances the procedure should consist in first removing the remaining cement from the interior of the cap, with burs, and then thoroughly cleansing in acid. The dowel should now be grasped firmly in a jeweler's

Replacement of Facing and Backing.

Procedure.

pin-vise (Fig. 152) (which is a most useful instrument in this work), and the backing removed up sufficiently close to the base of the crown to offer no obstruction to the proper adjustment of the facing.

The cap should be then placed in position upon the root, and the usual "bite" and impression taken, when the repair can be made upon the models in accordance with the usual method of construction from this point on.

Removing.

The removal of this style of crown may often become necessary for the purpose of replacement or substitution, and while the procedure may

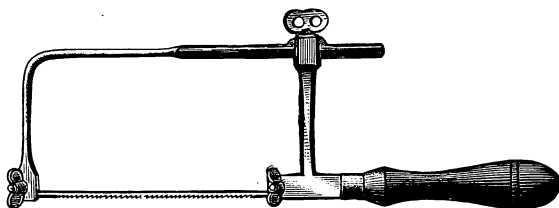


Fig. 151.

be found somewhat difficult in those cases where the attachment remains secure, it may be effected by one or the other of the following methods:

Use of Excising Forceps.

The easiest and most convenient method, whenever applicable, is to first crush and remove the facing if present, and then grasp the remaining backing up close to the base of the crown, where it is thickest, with the beaks of a pair of excising forceps (Fig. 153) (which is also a most useful instrument), and then gradually and slowly fracture the cement and destroy the integrity of the attachment,



Fig. 152.

by exerting a slight pressure upon the handles and a *lateral* or *rotary* movement upon the crown.

The power of the lever, in this application, will usually result in the ready detachment of the crown from the root, but force should be applied slowly and with extreme care, in order to prevent injury to the periodontal membrane, or the removal of the root.

In the event of *loosening* the root, because of its instability, or of the

strength and integrity of the attachment of the crown, *which will always cause a slight gingival hemorrhage*, this procedure should be at once discontinued before injury has resulted, and another one requiring less force will be demanded.

**Separating
Cap and Dowel.**

When the above method seems contraindicated, or proves ineffective, or where the backing has been previously destroyed until no opportunity is afforded for its application, the removal may be facilitated and made easy and devoid of danger, by first separating the cap from the dowel.

This may be done by drilling through the base of the crown at a point *approximating the periphery of the dowel*, until the root has been reached, with a small drill or round bur, and then severing the cap from the dowel with burs of a larger size.

When this has been accomplished, if it is desirable to utilize the cap again, it should be worked loose and lifted off with pliers; but if no further use is to be made of it, the procedure may be facilitated by destroying the continuity of the band with excising or crown slitting forceps, or a small bur.

The remaining dowel should then be removed by cutting away the surrounding cement with *very small* round burs, until it may be gripped with strong small-pointed pliers, and the entire length removed.

In this procedure, however, care must be exercised to avoid perforating the root, or breaking off the dowel at a point which will preclude the removal of the remaining end.

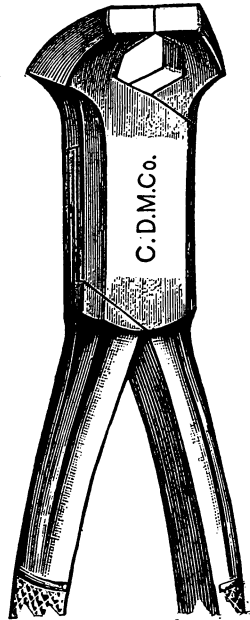


Fig. 153.



SOCIETY PAPERS

Porcelain Enamel.

By N. S. JENKINS, D.D.S., Dresden.

Read before the Society of German Dentists Graduated in America at Stuttgart, May, 1902.

In the first paragraph of a most appreciative and instructive article entitled: "The Availability and Construction of Porcelain Fillings" published in *ITEMS OF INTEREST* in April, 1902, by Dr. Rodrigues Ottolengui, occurs this sentence: "A curious fact to be recorded in connection with porcelain is that there seems to be a greater faith in the new departure in Europe than in America." The distinguished author proceeds to discuss this fact, imputing it primarily to the greater development of the esthetic sense in Europe. While, no doubt, European patients do more strenuously object to the disfiguring appearance of gold than is the case with American patients, and while it may be largely for that reason, as well perhaps because of the greater stress which is laid upon beauty of every form in European education, and the influence which this training has had upon European professional men that this result has been attained, there are still other reasons why porcelain fillings have found favor in Europe.

In the first place, we have not been so generally misled by the high-fusing delusion. We have been more familiar with the comparatively low-fusing English artificial teeth, with their great strength and density, and have therefore been better prepared to believe that a perfect body of a yet lower fusing point might be obtainable. We recognized, long before our American brethren, the advantages of the gold foil matrix. I presume there is not now, and for some years has not been a member of this society who would think for a moment of distressing himself or his patient with the use of so intractable and unsatisfactory a material as platinum for this purpose.

Then, also, it is probable that the European practitioner is in some sense more free to make use of what material he thinks fit than is the case

in America. European patients have generally a degree of confidence in the judgment and skill of their professional advisers which leads them to place themselves unreservedly in their hands. There is little of that arrogance which assumes a better knowledge of the case and its treatment than he who has made disease a life study and whose livelihood is dependent upon the successful practice of what he has learned. As a body, we are perhaps more accustomed to be treated as professional men, with the self-restraint and feeling of responsibility which such a position engenders, than is the case with the majority of practitioners in America. I presume there is no member of this society who cannot carry out his convictions as to any innovations of practice without exciting either suspicion or opposition from his patients. These, and many other considerations which will naturally occur to all of us, have made so great a change in the methods of practice as has accompanied the introduction of porcelain enamel, tolerably easy. We have only needed to say to our patients, "this method is best adapted to this case," and further explanation or argument has been unnecessary.

Then, too, most of us have had to deal with a greater variety of clients than is the case in America. Europe is the smallest of the continents, and yet is the most greatly diversified in its population. In this human cauldron, into which Greek and Semite, Latin and Teuton, Kelt and Slav, and who knows what besides has been thrown, with all their attendant physical and psychological peculiarities, we have to deal with conditions which call for a wide range of treatment and for the exercise of well balanced judgment. It is therefore not surprising that we should have had our minds receptive to a plausible innovation, and that, having proved its value, we should have made enthusiastic yet prudent use of it. Accordingly I venture to suggest some of the conclusions which, it seems to me, we have reached with practical unanimity.

**Advantages of
Porcelain as a
Filling Material.**

Firstly: There is no question as to the esthetic results. We are able to take a mouth where the teeth are so disfigured with decay and fracture as to present a revolting spectacle, and to so treat it that it becomes a thing of beauty, every trace of disease, or its repair, being obliterated.

Secondly: We are able to make the patient perfectly comfortable. The shock which comes from sudden drafts of air, or from hot or cold food or fluid, exists for us no more. The quivering pulp, which, under the old methods of treatment it was anguish to preserve and murder to destroy, becomes a happy member of the human frame and serves its purpose without complaint. Teeth which were so sensitive that they could not be kept clean, become indifferent to the friction of the tooth

brush and permit the exercise of the means necessary to cleanliness. "Extension for prevention," in that large class of frail teeth where half disorganized enamel extends beyond the border of the true cavity has become a simple operation. The obtaining of a perfect margin in cavities extending deeply under the resentful gum is reduced to a mathematical certainty. Approximal contour can be obtained with an accuracy hitherto unknown. Masticating surfaces, which under gold or amalgam still wore or wasted away, may be kept permanently intact. Teeth which were formerly condemned to be crowned can be restored to beauty and usefulness. Nearly all those fearful operations which consumed hours of time and infinitudes of suffering have become obsolete.

Thirdly: By this method, for the first time in the history of dentistry, operations on the natural teeth can be made upon a definite and certain plan, a plan which any intelligent dentist can master and carry out with complete success. In this method nothing is left to the imagination, but everything is reduced to an exactitude which is especially gratifying to the logical mind and training of the European practitioner. To be sure, there is room for infinite difference in the ease and readiness with which the result is reached, and in the beauty and comfort of the operation; but there need be no question as to its efficiency. To obtain practical success it is only necessary to acquire the principles of the method, and then to take care to follow the rules intelligently.

Durability. Our American brethren will continue to question us as to the durability of this work. To this we can only reply, "time will show." Thus far, however, all the indications point to its unlimited permanency. With a properly made and inserted porcelain enamel filling, the chances of accident are reduced to insignificance. Dissolution of the cement is excluded, unless much of the walls of the tooth is broken down, and even then it goes on very slowly, for every year the attachment of the cement to tooth and filling seems to become more intimate and more resistant to both chemical and mechanical influences. Secondary caries is extremely rare. Some observers go so far as to say that it never supervenes, but that is, of course, an exaggeration. One cause of the marked immunity to the recurrence of decay is doubtless the suspension of capillary action between the filling and the walls of the cavity. We all know what subtle and hideous disasters may come to the most beautiful gold filling, especially in a tooth of low grade structure, through ever so minute a rift between tooth and filling. Such a rift often leads to discoloration, recurrence of decay and fatal irritation of the pulp, in many cases with great rapidity. But a defective spot at the edge of a porcelain enamel inlay, while it is a blemish, remains, for indeterminate time, only a blemish still.

It does not furnish a good opening for micro-organisms to practice their deleterious influences, and may remain harmless to the health of the tooth or the stability of the filling for a long period of time. In any event, the extraordinary ravages of secondary decay, such as we frequently discover under a metal filling, seem never to occur with an inlay.

For generations we have been receiving from America the highest scientific and practical instruction in that branch of medicine which constitutes our specialty, until we have come to have almost a superstitious reverence for all that America offers us. Especially the members of this society have occasion for gratitude for all that America has done for them. And if now we receive and pass back again the torch of enlightenment glowing with the radiance of a European discovery, it is but a partial return for the benefits which we have so freely received and from which we have profited so greatly.

Function : Its Influence on Structure.

By C. N. PEIRCE, D.D.S., Philadelphia, Pa.

Read before the Boston and Tufts Dental Alumni Association, April 9, 1902.

That tissues are made of cells of original or altered shape, separate or confluent, is well known.

That the arrangement of tissues into organs is due to the multiplication and direction of cells is also evident. In the higher organisms, we have muscle, converting the results of nutrition into muscle; skin making more skin; brain making more brain; bone making more bone, etc., etc.

In all this reproduction of structures we should appreciate the fact that the more perfect is but a modification or transformation of the less perfect. But in this whole plan of creation we must accept all changes as an endless succession of cause and sequence, influencing all matter animate or inanimate.

While the foregoing has but an indirect influence upon the theory of use and disuse modifying structures, yet it does point to the condition which the following paper will attempt to emphasize, namely, that organs and organisms are but a modification of something that has preceded them.

Influence of Use and Disuse Upon Tissues.

So difficult is it to reach the exact truth regarding any proposition on the more or less permanent and transmitted alterations in the structure of organs and animal forms, that one feels much disposed to hold his judgment as suggested by your late townsman,

John Fisk, "in readiness for revision." The effect of use and disuse on structures is, however, so manifestly persistent that conclusions are drawn without much hesitation, and it is only when the query as to limitations is made that the possible recognition of other forces may step in and say thus far shalt thou go. Most of those who have been considering the factors in evolution since the days of Lamarck (1744-1829) place great importance upon the effects of disuse in the atrophy of organs, and give many illustrations of its influence, such as the weakening of the muscles of the ears in domesticated animals and in man; the abortive eyes of moles, certain rodents and cave fishes; also the lighter wing bones of domesticated ducks and other fowl; the reduced size of the little toe in man; the reduction of the toes in the horse; and we might add the appendix-vermiformis in man. Illustrations may be cited almost without limit, resulting from disuse or absence of function. On the other hand, instances quite as numerous may be given showing that function or use has a marked influence in not only facilitating development, but oftentimes in increasing the size of the organ and the efficiency of the animal possessing it. A few of these that are familiar to you all may be cited, such as the leg-bones of the varieties of the fowl; the udders of the cow and the goat; the powerful limbs of the heavy draught horse, as well as the delicate structure of the racer; the efficiency of the toes of man born without arms, and also the toes of the men and women of Panama who fish for oysters in the ocean when the tide is running in and the water in which they are standing is to their armpits; the dermal surface of the hydra adapted to its environment without reference to which side is out; the beak of the shoveler duck; the baleen plates in the mouth of the balenoid or great whale; the muscle of the blacksmith's arm in response to its forging; the increasing size of the great toe from carrying the weight of the body; the thickness of the epidermal tissues in the palms of the hands and the soles of the feet; the growth of corns; these latter may come from friction, pressure or strain, but they are nevertheless subject to influences which may properly be termed use.

That the flow of blood is increased towards organs or structures performing work is a very natural assumption, and that parts not used or exercised would proportionately be deprived of that nutritive fluid is certainly a sane conclusion. Frequently recurring efforts then would simultaneously supply the tissue with more blood and hence better nourishment, so that as an inevitable result the size must be increased, and by transmission succeeding generations be naturally influenced, while with the reverse, the absence of nourishment, must result in vessels of diminished size and less pronounced tissue.

It is then quite true that evidences of not only progressive develop-

ment, but of reversion, retrogression, atavism, if you please, can be cited without or almost without limit.

Before attempting to utilize these statements as anticipated, a word must be added about mutilations. **Mutilations**
Not Transmitted. With this theory of the influence of use and disuse upon structures, efforts have been made to associate the idea that mutilations should also be so intimately connected as to modify any statement made regarding the transmission of an atrophied or an enlarged structure. The facts, however, disprove the transmission of mutilated organs. Frequently the experiment has been made, but always with the same result. Structural alterations resulting from mutilations are not transmitted.

In all animal structures we have two alternative propositions expressive of their uses. *Either the necessity for and attempt to use preceded the adaptive structure, or else the structure preceded and gave origin to the desire for use.* **Influences of Environment.**

The facts at our command certainly make the first proposition much the more probable of the two.

The structures of living beings are either adaptive or non-adaptive; they are either in anticipation, fitted to meet the peculiarities of their environment, or they are not.

It is an almost every-day experience that changes in environment occur without warning or preparation for them on the part of living things. If changes are very great, the animal may succumb, but usually the elasticity of life is such that the influence of the environment is tolerated, and the special adaptations must follow, and not precede, conditions of climate, location, population, food, etc., etc. In connection with this, we have the other important consideration, nutritive material must be called to affected localities to sustain the change, whether the tissue involved be muscular or otherwise. One of the direct evidences which we have in support of the view that motion affects structure directly is that organs are increased in size and power by use. This increase is of course limited by the fixity of all the organs, so that one cannot be increased to the detriment of the others in use. Illustrations of this are not necessary beyond stating that the limitations of each organ must be subservient to the possibilities of congenital structure. Especially is it desirable now to direct your attention to the query, "Are the hard and most dense structures, such as the tissues of the teeth, subjected to the same influences as the more vascular, and if so, do they respond as certainly to use and disuse, or impressions of friction, pressure and strain?" This is assuredly an inquiry in which dentists are certainly largely interested, and in the

answer the whole scope of what we term operative dentistry is involved.

A simple and not infrequent condition, with which you are all familiar is the firm union which takes place between the cement of the root of the tooth and the process forming the socket, probably most frequently located in the mouth of the seamstress, who has been accustomed to biting off threads with the convenient but much abused cuspid. Molars and bicuspid are, however, liable to the same anchlyosed condition between process and cement where the teeth on the opposite side of the mouth have been prematurely lost, or where the individual has been in the habit of using one side of the mouth exclusively in the mastication of food. The superior third molars, when crowded, are also from the strain, which is continuous, similarly attached to the process.

Reference to some of the simplest vertebrate teeth illustrate this influence perfectly. In the little dogfish but recently hatched you will find the external surface carried over the jaw utilizing the spines (placoid scales), but slightly modified, while under the influence of subsequent function they increase in size and density.

Arising from the integument, may be added also the almost endless variety of teeth, found in the class *Pisces*, or fish tribe, these offering in every particular a most remarkable differentiation as regards size, structure, attachment and density. The teeth of the shark are but modified spines, their size and structure corresponding with location and function, the latter being the adaptive agent. Animals such as the dolphin, using their almost numberless teeth only as prehensile organs, simple cones on the maxillary, with size and shape so nearly uniform, may well be termed homo-donts. Though simple cones, they are not less adapted by their use or function.

By this time you have doubtless anticipated the trend of my thought. Most certainly what has been said would place all teeth, simple or complex, in the same line of development, and this is true without reference to their origin being from the epiblastic or hypoblastic membrane or layer. In this then the teeth of the following classes must be included: Marsupial, Cetacea, Insectivora, Rodentia, Cheiroptera, Carnivora, Proboscidea, Articulata, Perisodactyla, Lemurs and Primates. Use or functional influence, exerted, must specialize, and render them most efficient in serving the needs of the animal, as pre-assimilative organs, and that without reference to the animal being terrestrial, arboreal or aquatic.

This much has been said, you will think, rather dogmatically; to modify the statement a few additional illustrations may be pertinent. The nine-banded armadillo examined from the side of the crania, beautifully displays the absence of enamel on the teeth; that this condition has been reached by a process of retrogression or degradation seems to be fully

established. Charles S. Tomes has demonstrated that the tooth germs of this armadillo have distinct enamel organs, which are subsequently aborted as the tooth comes to maturity. This discovery, Mr. Jacob L. Wortman, in his article on comparative anatomy of the teeth in the "American System of Dentistry," says, "is important, since it indicates pretty clearly that the loss of enamel is a mark of degeneracy, and leads indirectly to the conclusion that the armadillos at least are descended from ancestors with enamel covered teeth, who in all probability were the possessors of a completely developed permanent set." The only assignable cause for this degenerate condition—the absence of enamel—is the jaw movement and food habit, this group of animals having a long tongue covered with a viscid secretion for the capture of insects which constitute their food, the same being swallowed with little or no mastication.

Another conspicuous illustration is found in those animals having the antero-posterior movements of the lower jaw. The molars of the muskrat, of the capybara and of the India elephant, representatives of widely different animals, but so similar in the transverse arrangement of the enamel infoldings, and in their efficiency in the trituration of food, as the jaw is moved front and back, that we cannot overlook their pertinency at this time.

The extinct horse, the modern horse and the rhinoceros each has quite the same mandibular movements and jaw excursions, hence the same trituration ability must correspond with the enamel enfoldings, which are not, as in the previous case, arranged in a transverse manner, but at various angles, so as to render the efficient service. The molars of the carnivora as well as the incisors of the rodentia, are not less conspicuous illustrations of the specialization of structures than those which we have enumerated.

You may very appropriately make the inquiry as to the ancestral influence in the illustrations given. It is doubtless an important factor, but it nevertheless does not detract from the influence of the original habit, which has established the dental structures which have been so persistently transmitted.

Again the inquiry may arise: Are these isolated cases? to which the response shall be, that all animals with a specialized food habit display the same peculiar correspondence between jaw movement and adaptation of tooth structure which renders the most efficient service in the trituration of food. Assuming the foregoing to be a correct exposition of dental evolution, adaptation and function, the origin and development of the *human* molar follows, its evolution being emphasized through "cusp addition" rather than the theory of "cusp

Cusp Addition
and
Cusp Concrescence.

concrecence," though the latter has been so strongly urged by some German odontologists (Professor Schnable, Dr. Carl Rösä, Professor Kükenthal).

These two terms are thus placed that some short explanation may make clear their significance; the former, cusp addition, is formed by the addition or rather by the projections of immature cusps, to the sides of a primitive single cone tooth, such as is found in the dolphin or toothed whales, while the concrecence theory necessitates a combination of these simple conical forms being cemented together, the tip of the cone constituting the foundation for the future cusp. In order that this theory should be sustained, all mammals possessing compound or complex teeth must at some early period have had a very much larger number of teeth, but all of quite a simple conical form, and these must have been grouped together in order that the tri-tubercular, the quadri-tubercular or the multi-tubercular crown might be formed. In order to complete the adaptation, essential to normal occlusion, the exercise of their function would certainly have to be brought into requisition, and even then much friction and strain would be required in order to reduce the triturating surface to a satisfactorily working condition. A very serious obstacle to this theory, however, is the source of the essential force that is to bring the cusps or points of these individual teeth into variable groups according to the more or less complex patterns of the prospective crowns. Enough now of this concrecent theory has been said to make you familiar with the processes involved.

In reference to the cusp addition theory, certainly every observing practicing dentist has noted projections from the crowns of permanent teeth resembling immature cusps, and these are not always confined to the crowns of molars; incisors and cuspids have shared in these projections sufficiently often to indicate the part they have probably taken in tooth evolution.

One more illustration in favor of this cusp addition theory. Every one who is at all familiar with the lower molars and their fifth cusp will give evidence of its location between the lingual and buccal distal cusps. Never does it make its appearance on the anterior or mesial part of the crown, but always on the distal, and the third molar, which in so many mouths is in a degenerate condition, is very rarely in civilized life more than a quadri-tubercular crown.

Those of you who have given little thought to this method of tooth development will doubtless think that it requires some exercise of the imagination to see new additions to what was originally a single, simple and more or less conical tooth.

But you must appreciate the fact that Nature does not work rapidly

in the modification of structures, and the language of Lamarck indicating this is certainly wise and pertinent. He says: "The production of a new organ in an animal body results from the supervention of a new want continuing to make itself felt, and a new movement to which this want gives birth and encouragement, * * * and that the development of organs and their force of action are constantly in ratio to the employment of these organs."

Imagine these minute projections and ridges, actually present, and in the succession of generations see them increasing in size and adapting themselves to the service of the animal through the influence of the friction or impact of the food habit, and you will see a condition that was most certainly an early effort at tooth formation and at a time when much that is now was immature. A word regarding embryology, as a factor in elucidating this subject. You are all familiar with the enamel organ and how it is formed, also with the origin of the dental papilla; both of these germs, if the eye does not deceive one, are but a single diversion or projection from the parent membrane. That calcification beginning at several points cannot be regarded as any evidence that either is a compound structure. So the evidence we get from embryology but sustains the proposition that the simple, single, cone shaped tooth is the parent of the multi-tubercular crown.

From the previous pages you infer that the teeth in their development, like the more vascular tissues, are dependent upon function and inheritance for their morphology, structural arrangement, density and size. In the exercise of those factors should be placed as of first importance jaw movement, or the mechanical force involved in these mandibular excursions. This force must of necessity vary with the food and the difference in the degree of resistance it offers in its comminution. Following this would come that most important evolutionary factor, heredity. The formative influence of function is seen in the teeth of the Gasteropoda, where variety in shape is a constant concomitant of variety in food.

It is in evidence in the Mysticete or Balaenoidea, where the great plates are so well adapted to securing low forms of life in the sea. The sharp, cone-shaped teeth of the Denticete so well adapted to seizing live prey upon which the sperm-whale lives illustrate it.

Also in the molars of the Herbivora, where the infolding of the enamel, with less dense structures, always presents sharp surfaces for the cutting of dry and coarse vegetation. And in the molars of the Proboscidea and Rodentia, where the transverse enamel layers are so efficient in the trituration of food. The trenchant-shaped molars of the carnivora illustrate it in their lacerating capacity, the edentata also in the abortive enamel from the tooth crowns. It is seen in the teeth of children where

the triturating or comminution function is delegated to the stomach, and in the third molar of man, where it is variable, in time of eruption, in size, structure, shape and durability, from the absence of function, in the modification of diet, and the shortening of the lower jaw with growth of civilization and increased intensity of the nervous system.

In conclusion, let me repeat here the following **Conclusions.** postulates, some of which I have previously used and published:

First: That the tendency is to the suppression of organs and tissues not used, and the development of those most used.

Second: That the teeth, notwithstanding their density, are, like the more vascular tissues, subject to modification from use and disuse.

Third: That the food habit and cumulative results of heredity have been important factors in shaping tooth forms.

Fourth: That the degree in which teeth are modified from a simple type is in correspondence with the differences in the degree of resistance to be overcome in the mastication of food.

Fifth: That the restriction and limitation of diet has contributed to the specialization of the teeth.

Sixth: That the varied and omnivorous diet of the human family and the disuse of their teeth have retarded the specialization of these organs, and encouraged dental decay.

Seventh: That an invariable result of the effort of specialization is a reduction in the number of teeth.

Eighth: That in the trituration of food there is a constant effort to establish such excursions or mandibular movements as will be most efficient in this pre-assimilative process.

Ninth: That the mandibular movements in the effort of mastication must largely control the specialized condition of the teeth, the glenoid plates and the condyles.



Public Dental Service.

By ALPHONSO IRWIN, D.D.S.

Read before the Central Dental Association of New Jersey, April 19, 1902.

The *Dental Digest* prints an article entitled "First Molar Necessary to Dentists' Financial Success." In it Dr. C. M. Wright says: "Twenty years ago a cultured dentist who had traveled extensively and possessed a lucrative practice in a large city, accompanied me to a dental society meeting, the first he had ever attended. The subject discussed was: 'Shall the Sixth Year Molar be Preserved?' Dr. Atkinson had suggested, if for any cause, early in life, one of the molars had to be sacrificed, it might be well to extract the remaining three sixth year molars, in order to preserve harmonious facial development. An animated discussion ensued from a scientific, surgical and æsthetic standpoint. Afterwards I asked my friend if he had found the meeting interesting. Said he: 'I was disgusted with the whole affair! I never listened to such stuff! Figure it out for yourself: The sixth year molars are particularly liable to decay, and each one may develop five or more cavities on the different surfaces. Let us say five; then we may expect to be called upon to insert four times five fillings in each patient's sixth year molars. Each filling, we may say, will be worth four dollars. Four times twenty equals eighty dollars for each patient's four first molars. Supposing a dentist has but one hundred patients a year who require these operations; one hundred times eighty dollars equals eight thousand dollars. Supposing that there are twenty thousand dentists in the world who have each these one hundred patients a year; multiply eight thousand dollars by twenty thousand, which equals one hundred and sixty million dollars, and you have that amount lost to the dental profession each year by the extraction of these sixth year molars.'"

If dentistry is only the science and art of extracting dollars out of the pockets of its patrons, you do not want to listen to anything about public dental service.

If the dentist worships the golden calf, dentistry is a trade, and I have no business to present this paper. But if the dentist has the welfare of the public at heart as well as the gaining of a plethoric purse, then dentistry is a profession, and such a paper is timely. Observation and experience prove that a plethoric purse is often the logical sequence of intelligent interest in the welfare of the public.

Some one may suggest that dental service is public. It is not true

that all dental service is public. There are persons whom you will not admit into your office. Usually when we speak of dental service we allude to our private office practice. In contradistinction to office practice, public practice is a term used to designate that service which is rendered to the public or to a specific portion of the public, such as are in institutions, or the army or navy, said service being rendered on salary, by contract or gratuitously.

This paper will be limited to a few observations from the standpoint of the practitioner, upon public service rendered in institutions under the United States Government, or state control, namely the army, the navy and the public schools.

**Public Dental
Service
a Vital Issue.**

The topic "Public Dental Service" is selected because it is a vital issue of the day. It is a vital issue because it possesses a prominent place in the minds of dentists. It is a conspicuous subject in dental journals. It inaugurates a new era in the history of the practice of dentistry. It expands the influence of the profession. It extends the usefulness of the science and art to all classes and conditions. It has been adopted by the United States Government. It is gaining favor with the public.

The public esteems a profession in proportion to its progressiveness and aggressiveness. The profession of dentistry is both progressive and aggressive. The dentists of the State of New Jersey are foremost in all progressive and aggressive movements. Therefore if the dental profession in the State of New Jersey wishes to maintain a high position in the esteem of the public and retain their prestige as promoters of progressive dental development, we must advocate public dental service.

A paper read before the Central Dental Association of New Jersey, November 19, 1900, closed with the following statement: "Two potent forces destined ultimately to bring about the universal adoption of public dental service are, first, agitation of the subject by the dental profession; second, pressure arising from the law of necessity." These two virile forces are working today. They give inspiration and impetus to the movement. They make it a vital issue between the dentist and the public, the dentist and the state.

If the widespread interest manifested by the professions and officials throughout the United States as expressed in an extensive correspondence, is any criterion by which to judge, it not only proves that it is a vital issue because it is gaining in public favor, but it also presages the early adoption of a systematic public dental service. This interest is not confined to the United States, but it intensifies itself as we extend our investigations abroad.

At the meeting of the International Dental Federation in Cambridge, England, August 7, 1901, composed of representatives from seventeen nations, Dr. Rosenthal presented the following proposition:

"*Resolved*, That a commission be appointed to study the means of educating the public upon dental matters." It was referred to the Executive Council. The Executive Council presents questions of "greater importance" to International Dental Congresses. The dental "Solons" will have to wrestle with this problem at Stockholm in August, 1902. It will probably be assigned a prominent place at the next International Dental Congress. It is therefore evident that the "education of the public upon dental matters" is not limited to any town, state or nation, but that the urgent need for it is universal. In this country knowledge concerning dental matters is best imparted to the public by personal contact. In other words if you want to educate the public, *serve the public*.

The public say "Educate the dentist." The dentists say "Educate the public." Both are right. There is a dividing line between the truth and error. Each dentist must know where that dividing line exists and be able to convince the public of that fact. The public must know where and when intelligent discrimination should be made between dental truth and error. Therefore the public must be educated as well as the dentist. Herein lies the solution of the problem. The opportunity to fulfill these obligations is afforded by rendering systematic public dental service in public institutions, the army and navy. Do we discharge our duty to the public?

Without public dental service the knowledge of how best to preserve the usefulness of the teeth with comfort is confined to those persons who can pay for dental services, and the comparatively few who are operated upon in the clinics, dispensaries and rooms of the dental colleges throughout the United States. Sum all the totals of these patients up, and we will be astonished at the insignificance of the number, compared with our eighty-four millions of population; therefore the international as well as the national need for public dental service stamps it as a vital issue of the day. Taking advantage of the urgent need of the masses, dental parlors flourish all over the land. The quack pursues his vocation unchecked. As soon as one field of operation becomes unprofitable he seeks and finds ignorant people elsewhere, while the complacent, ethical dentist shrugs his shoulders derisively and talks patronizingly about missionary work when you allude to public dental service as the remedy. Confronting this vast array of humanity are thousand of bright, energetic, talented graduates and skillful dentists wondering why they do not have more work to do, or casting their eyes around for a favorable opportunity for dental development. Here lies the opportunity.

Oral Hygiene.

In direct line with the development of public dental service, and in fact as the foundation for such service, is the introduction of oral hygiene. This phase of the work is properly emphasized in our dental societies. At the annual meeting of the National Dental Association, held at Old Point Comfort, Virginia, July, 1900, the following resolutions were adopted, after being read by Richard Grady, M.D., D.D.S.:

"Resolved, That a special committee of five be appointed by the president to consider the expediency of inaugurating steps looking to the co-operation of the public schools in teaching 'Good teeth, good health.'

"Resolved, That said committee report the result of its deliberations to this, the National Dental Association, at the earliest practical moment."

A committee, designated the "Committee on Oral Hygiene in our Public Schools," was accordingly appointed by the then president, B. Holly Smith, M.D., D.D.S., with Dr. Richard Grady, of the United States Naval Academy, as chairman.

The transactions of the National Dental Association for 1900 and 1901, printed in book form, contain reports of the work of this committee. A letter comprising accurate statistics of a very suggestive character, embodying the subject and a working plan for dentists to follow, has been addressed to the Central Dental Association of New Jersey and other dental societies. These facts are recited in order to refresh our memories. Other details will be omitted, except to remind you that the results of the careful examination of the mouths of about twenty thousand children in Germany, ranging from six to fifteen years of age, revealed that 95 per cent. of them had dental caries, 372 anomalies of different characters, including harelip, cleft palate, irregularities and V shaped jaws. A careful perusal of the letter from the committee on oral hygiene will convince you that the amount of dental work is enormous; that Germany is ahead of the United States in regard to public dental service in schools, and that public dental service is practically endorsed by the National Dental Association, the most cultured, scientific and powerful organization of dentists in the United States of America.

**Dentists in
the Army
and Navy.**

As a direct result of the agitation of the introduction of public dental service in the United States by the dental profession, and the pressure exerted by the necessity for such service, there are now thirty dentists appointed to attend to the needs of the army, and the promise that fifteen dentists will be appointed for the navy.

Dr. P. M. Rixey, Surgeon General of the United States Navy, informs me that there are no dental corps in the naval service. It is understood, however, that legislation is pending, having the establishment of such a

corps in view. The Bureau of Medicine and Surgery, Navy Department, is in favor of the appointment of dentists for duty in the navy.

Hon. H. C. Loudenslager, the representative from the southern part of the State of New Jersey in Congress, voted for the passage of the bill providing dentists for the army, and he assures me that he favors the passage of a similar bill through Congress for the appointment of dentists to attend to the teeth of sailors in the navy. He informs me: "In reply to your inquiry I can only say to you that (dental) surgeons are now appointed to the army. No action has yet been taken regarding the navy. (The salary of the dentists in the army is one hundred and fifty dollars per month, and is by contract.) My vote for the bill which carried with it the appointment of the dentists shows very clearly that I was in favor of that measure. The matter is now being discussed regarding their selection in the navy, but that has not yet reached any definite line of action, and the department does not appear very active regarding it."

Notice the last sentence, "The department does not appear very active regarding it." That means that you and each dentist in the State of New Jersey, and every dentist in the United States, should write to his representative in the State Legislature and in Congress, requesting in plain terms that the bill providing dentists for the navy should be put through immediately. Bring all the pressure you possibly can to bear upon your representative. Talk it up among your patients who are politicians or can influence our legislators, and it will not be long before dentists will be serving professionally in the United States Navy.

After we have fifteen dentists serving in the navy and thirty in the army, taking care of the mouths of our soldiers and sailors, it will be in order for the dental profession to convince our legislators of the following fact, namely: If it requires one dentist to keep in order the teeth of one thousand men, then it is a logical deduction that it requires one hundred dentists to take care of the teeth of one hundred thousand soldiers and sailors.

By working in this manner to attain our object, public dental service will be ultimately established under government and state control, and dentistry will be correspondingly enhanced.

In speaking about the Naval Academy at Annapolis, Dr. Richard Grady states:

**Dr. Grady's
Letter.**

"Oral hygiene receives attention both from the surgeon in charge of special instruction and the dentist at the Naval Academy." Quoting from the regulations, he says: "All cadets shall have their teeth examined and attended to by the dentist at least once in each academic year. Appointments for dental examinations and necessary work are made by the dentist on memorandum

slips, which are filed with the officer in charge. In emergency cases, permission to see the dentist is secured through the medical officer. The dentist endeavors to arrange appointments so as not to interfere with academic duties.'

"The Naval Academy has cared for the teeth of the cadets almost from its birth. I am the third dentist in the employ of the Academy, and my predecessor served forty-three years. Up to last year I was the only dentist in the employ of the United States Government."

In marked contrast with the state of efficient dental service as exhibited by the Naval Academy at Annapolis is the utter lack of enterprise, not to say neglect, manifested by the authorities over West Point Military Academy.

Dr. Kneedler says:

**Dr. Kneedler's
Letter.**

March 28, 1902.

DR. A. IRWIN, Camden, N. J.:

MY DEAR DOCTOR: The question that you are agitating is a most important one—how important no one can more fully appreciate than the army surgeon who has had to serve with a command away from dental assistance. I should favor the systematic examination of the teeth of cadets at the Military Academy, with official reports to the superintendent of dental service.

A cadet's and a soldier's vaccination record is kept officially. The same could be done in regard to his dental record.

Very respectfully,

WILLIAM L. KNEEDLER,
Surgeon, U. S. Army, Academy.

The newspapers recently published the following:

WASHINGTON, April 15.—The House Committee on Military Affairs have decided to incorporate in the regular appropriation bill for the support of the West Point Academy an item of \$6,500,000 for badly needed improvements at that institution.

It would seem as though an opening existed here. Some conscientious, hard-working, enterprising dentist ought to take an active part in making "needed improvements at that institution" and thereby relieve the cadets of dental infirmities and the "House Committee on Military Affairs" of a portion of the burden of spending that six million five hundred thousand dollars.

The most laborious, painstaking and skillful efforts of the dentist are brought to naught. Decay recurs in filled teeth because through lack of knowledge the patient fails to supplement the work of the dentist by observing the simplest rules of oral hygiene. For instance, many people know how to "scrub the teeth." Any washerwoman can do that.

But scarcely one person in a thousand knows how to CLEAN the teeth. If a dentist fills a tooth and fails to leave an absolutely self-cleansing surface, decay will recur unless the patient cleanses properly the filled surface of the tooth. It makes no difference whether you use gold, silver, tin, alloy, cement or gutta percha and the work is the very perfection of human skill. We all know, in time, that work will fail unless all acids and debris are removed from the teeth frequently and thoroughly. Our professional skill is at stake. Our honor demands that we publish the truth to the public. Therefore the importance of teaching and practicing oral hygiene is evident. How can you better convey dental truth than through public dental service rendered to children, when their minds are indelibly impressed. Our opportunity to impart an oral training to the public is through the school children from six to fifteen years of age.

**Oral Hygiene
in Public Schools.**

We know what dentists think and say, also what the dental journals publish in regard to public dental service. Consequently my efforts have been in the direction of securing the opinions of public educators and the attitude of public schools toward the dental profession. A circular letter was addressed to each one of the state superintendents, also to each of the county and city superintendents of the State of New Jersey. The eighty-two replies received are significant for their promptness, courtesy and intelligence. The fact that eighty two persons answered out of one hundred and three interrogated proves that public dental service is of interest to the public instructor. The four questions asked in the circular were: First, does oral hygiene receive attention in public schools? Second, if it does not, in what form would you advise its introduction? Third, do dentists render public dental service, by appointment or otherwise, in the public schools of your state, county or town? Said service consisting of examination of the teeth at regular periods, making out a chart of decayed teeth and dental service needed, and sending same to parents or guardians, accompanied by the request that the teeth receive the necessary attention from the family dentist. If not by him, then authorizing the official dentist to do the work. Every superintendent answered that dentists did not render public dental service in public schools. Fourth, do you favor the appointment of dentists to take care of the teeth of pupils in public schools? If not, why not? These questions elicited answers of interest to the dentist.

Washington, D. C., April 18, 1902.

Alaska.

DR. A. IRWIN, D.D.S.:

SIR: In response to your circular of March 19 I would state that oral hygiene receives attention in the public schools of Alaska only in connection with temperance.

In response to your third question I would state that the majority of our schools are not within from 50 to 500 miles of a dentist, and there is no system, by appointment or otherwise, whereby the teeth of the children in the schools in Alaska are examined at regular periods.

In response to your fourth question I would state no, not in Alaska, simply because the majority of the pupils cannot be reached by a dentist, and the cost would be entirely disproportioned to the services rendered.

Very truly yours,

SHELDON JACKSON,

General Agent Education for Alaska.

Trenton, N. J., March 10, 1902.

New Jersey. DR. A. IRWIN:

DEAR SIR: It seems to me hardly practicable to secure both medical and dental inspection in the public schools of the state. Should the teeth of a pupil be in such condition as to endanger its general health I think the matter would not be likely to escape the notice of a competent medical inspector. Medical inspection is intended simply to supply "the ounce of prevention" and not meant to include either free medical attendance or free dental service.

Respectfully yours,

C. J. BAXTER, State Superintendent.

Twenty-six states out of forty-five answered the circular letter.

The responses of the twenty-one county superintendents of New Jersey were as follows:

Burlington Co. Oral Hygiene is taught in the public schools of this county. IV. No, I do not believe in pauperizing. If dentists, why not oculists and so on *ad infinitum*?

Bergen Co. I. The law requires it (oral hygiene) to be taught. IV. Yes, I favor the appointment of dentists to take care of the teeth of pupils in the public schools.

Gloucester Co. I. Yes, oral hygiene is taught. IV. Yes, I favor the appointment of dentists.

Somerset Co. I. Yes, oral hygiene is taught in the public schools of this county. IV. I have given the subject no attention, therefore can give no intelligent reply to question IV.

Cape May Co. I. Yes, oral hygiene is taught. IV. Yes. (Favors the appointment of official dentists.)

Middlesex Co. I. Yes, oral hygiene is taught. IV. It is largely a personal matter.

Mercer Co. I. Oral hygiene receives attention in the primary grades. IV. I do not consider the appointment of official dentists practicable in country schools. The evidences of neglect on the part of parents are not such as to warrant the great outlay of money. My schools are rural schools.

Essex Co. I. Yes, oral hygiene is taught. IV. No, I am not in favor of the appointment of official dentists.

Morris Co. I. Yes, oral hygiene is taught. IV. Yes; but would it not be as important to have a specialist to examine the eyes and ears as well? The question in my mind is where would the limit of such service come?

Camden Co. I. Yes, oral hygiene is taught. (IV. is evaded.)

Warren Co. I. Yes, oral hygiene is taught. IV. Yes, I favor the appointment of dentists.

Monmouth Co. I. Yes, oral hygiene is taught. IV. Have not thought much about it (appointment of official dentists). I should say no. Parents should take this responsibility. There would be no end to what the state might be called to do if attention was given to such specialties.

Hunterdon Co. I. Yes, oral hygiene is taught. IV. No, I do not favor the appointment of dentists to take care of the teeth of pupils in public schools.

Salem Co. I. Yes, oral hygiene is taught. IV. Have not considered the question sufficiently to give an intelligent answer.

Hudson Co. I. Yes, in this county. IV. I believe that such appointment would be of inestimable value to the public.

The county superintendents of Atlantic, Cumberland, Ocean, Passaic and Union did not answer the circular letter. Of the fifteen who did respond, each said oral hygiene was taught in the public schools under his jurisdiction. Six county superintendents are opposed to the appointment of official dentists, six are in favor of the appointment, two have not given the matter sufficient thought to express an opinion and one failed to answer question IV. at all.

The opinions of the city superintendents of public schools in New Jersey:

Asbury Park. I. Yes, oral hygiene is taught. IV. No, we have a medical inspector who makes a physical examination of each pupil each year. If the teeth need

attention, parents are informed of the fact on a separate blank, which advises them to consult the family physician.

Salem. I. No, oral hygiene is not taught. IV. No we cannot successfully do what we now try to do. I do not think it wise to try to do more.

Camden. Oral hygiene is only taught from text books. IV. Not at public expense. I would advise anything for the preservation of the health. They should be looked after by the parent or guardian,

Bayonne. I. Oral hygiene is taught in the form of instruction only. IV. It seems to me at present that the school is doing all that is proper by warning parents of the necessity for caring for the teeth of children.

Rahway. I. Yes, oral hygiene is taught. IV. Appointment of official dentists? For the needy, yes. To report need of dental repairs, yes. I should not like to see the state support dentists, for all. I think parents ought to have some responsibility; that the state ought not to become too paternal. It already does quite enough.

Gloucester City. I. Yes, it is taught by the regular teachers. IV. No, because while the object itself is meritorious, yet in practice it would be fraught with the same evils that attend the appointment of medical inspectors in the schools, and but extend the field of Gloucester City for the operation of corrupt politics—the curse and damnation of our municipalities.

Morristown. I. It does in our schools and I suppose in others. IV. I do not favor the appointment of official dentists. I do not think the community should be taxed to pay for dentistry. This may properly be left to the parents.

West Hoboken. I. Certainly, oral hygiene is taught; we lay great stress on this subject, especially in primary departments. The fact is, this is the best possible way to teach the chief laws of health. IV. Yes, I do favor the appointment of official dentists. The only objection is the expense.

East Orange. I. Yes, oral hygiene is taught. IV. No, too paternal.

Town of Union. I. Yes, oral hygiene is taught. IV. Yes, I consider it of the greatest importance, as the proper care of the teeth will prevent many diseases.

Paterson. I. Yes. IV. Yes. (Favors the appointment of dentists.)

Atlantic City. I. Yes. IV. Yes. (Favors the appointment of official dentists.)

New Brunswick. I. Yes, oral hygiene is taught. IV. Not at present. I do not believe that paternal responsibility should be shifted to the public schools.

Passaic. I. Yes. IV. Theoretically, I think it would be wise. Practically, this particular community is not ready for it.

Perth Amboy. I. Yes. IV. I favor anything conducive to the health of school children. Good teeth being a necessity to good health, I answer affirmatively.

Newark. I. No, oral hygiene is not taught in the public schools. IV. I have given the matter no thought (here is a chance for some missionary work).

Orange. Oral hygiene is a portion of the daily programme in primary grades twice a week. The state requires instruction in all grades on physiology and hygiene; part of this is oral. IV. No, I do not think we have reached that point. There are many good points in it, but as a practical feature of the work, no board of education will take such an advanced step.

Jersey City. I. Yes. IV. Not at present.

Montclair. I. No, oral hygiene is not taught. IV. No, in the cities, and especially in the poorer wards, medical service at public expense seems to me justifiable.

Dentistry seems to me less important than medicine. It is important, however, and I should quite approve dental service at public expense for the indigent. I doubt, however, if it should be made a part of the public school system; but school officers should co-operate.

Among the twenty-six city superintendents of New Jersey, twenty answered the questions. Only six failed to respond. Eleven are opposed to the appointment of dentists, eight are in favor of their appointment. One, Newark, had given the matter no thought.

The supervising superintendents of Clayton, Glassboro, Woodstown and Manahawken, large South Jersey towns, all say oral hygiene is taught and are unanimously in favor of the appointment of dentists. Many letters have been received from regular teachers throughout the State of New Jersey, and it is a significant fact that those who come in daily contact with and are best acquainted with the needs of the pupils in public schools are in favor of the appointment of dentists to take care of the teeth of pupils in the proportion of four out of five.

These letters are so numerous and would take up so much time that it is necessary to exclude even a synopsis of them.

I would present the following as a basis for dental services in public schools:

I. Dental caries attacks 95 per cent. of the teeth of children in the public schools between the age of six and fifteen years.

II. General knowledge of the causes of dental ailments, the means of preserving the teeth by systematic attention, ought to form a part of the teaching of general hygiene in the schools.

III. Upon entrance into a school, attention should be called to the state of children's teeth. A dentist should examine the teeth of pupils at least once a year. When decayed, a chart should be made out, showing what attention is needed, and requesting the family dentist to attend to the same or authorizing the official dentist to do the work.

IV. Palliative treatment and extractions should be replaced by systematic treatment, filling and correcting defects.

V. Provision should be made for the treatment of the teeth of poor children free of charge.

VI. The remuneration of an official dentist should be determined by previous agreement with the proper authorities.

VII. The co-operation of the physician should be invoked and the value of his co-operation should be freely acknowledged.

Archimedes, with his lever, declared: "Give me a fulcrum on which to rest, and I will move the earth."

Give me the fifteen million four hundred and forty-three thousand four hundred and sixty-two public school children of the United States, and I will carry out any reform, correct any abuse and rule this nation.

Professionally speaking, give me the school children of this country, and I will annihilate the dental parlor, rob quacking of its victims, solve state examining board problems, win the eternal gratitude of dental faculties, and raise the dental profession upon the highest pinnacle of public favor.

Conservative Filling for Tooth Preservation.

By H. S. SUTPHEN, D.D.S., Newark, N. J.

Read before the Southern Dental Society of New Jersey, April 16, 1902.

I shall not endeavor to present to you this evening anything new or even out of the ordinary line of general practice, but shall simply attempt to bring freshly before your minds some principles and practices with which you are all thoroughly familiar, and it may be to present a little strongly the side of tooth preservation as distinguished from tooth ornamentation.

I am strongly imbued with the underlying and fundamental principle that our function as a profession is, first of all, to give "mouth ease," and, secondly, "tooth preservation;" the second depending upon the first.

We will not deal with the first this evening. I shall endeavor to point out to you, as briefly as may be, the ideas of your essayist on the subject of tooth preservation.

In all our operations, the first question which should arise on the examination of a carious tooth is, how shall I best preserve this tooth for the longest period of usefulness and comfort? The next question should be, fulfilling this first condition, how make it most æsthetic and true to its original condition and appearance?

Treatment of Deep Seated Caries.

Many cavities which present are so large and deep that the dentine is infected to the pulp itself, making it impossible and inexpedient for us to remove all the softened dentine.

In many cases the enamel walls are unsupported. Should the teeth be bicusps or molars, disinfect the cavity and place nearest the pulp a little jodo-formagen cement, then mixing oxy-phosphate cement thicker than for the setting of a crown, and thinner than for a filling, place it in the cavity and immediately press into this soft mass some amalgam. Carefully remove from the margins the cement which has appeared, and finish with amalgam. In this method you have all the benefits of the preservative quality of the cement, and the durability of the amalgam.

In the six front teeth I very frequently employ the same procedure, using solila gold to press into the soft cement. In this case, however, you press one piece of gold into the cement just hard enough to catch the gold with the cement and wait until the cement shall have hardened; then condense the one piece already in place and proceed as with any gold filling.

I would say for this method that I very seldom put in either a large gold or amalgam filling except in this way.

In all these cases, after the cavity is disinfected, it should always be coated with a lining or varnish of sufficient thickness to prevent shock from thermal changes.

This mode of practice obtains only with patients past fifteen years of age, and in the case of amalgam fillings, where you do not subsequently expect to place gold.

In children's teeth I would never place amalgam
Fillings in in approximal cavities in bicuspsids, but would use
Children's Teeth. instead oxy-phosphate or gutta percha, according to conditions. This prevents any possible staining of the tooth structure provided you did not have sufficient cement, and the cement itself would harden the tooth so that in the future you would be able to place therein a suitable and enduring permanent filling.

Children often come to you so nervous and apprehensive of pain, that to properly prepare and fill the cavities as you would wish, would mean such a shock to them that they would remember it for years, and perhaps always be under a severe dread of your operations. In these cases by using gutta percha and cement, you can dispense with much of the cutting, and be sure that your cavity will remain free from further decay, and that the dentine of the teeth will improve. By watching these fillings, and renewing when necessary, you can tide them over for a number of years, or until the time is ripe for their permanent filling.

Where cavities are found in the crowns of sixth year molars shortly after their eruption, it is often wise to fill with a high heat gutta percha, where your patient is extremely nervous and afraid of pain, and you wish to avoid annoyance as far as possible. At this age the gutta percha will oftentimes last longer than the cement as the patient does not masticate food so forcibly.

On the other extreme, the cement and gutta percha fillings are often indicated in elderly people whose physical conditions will not stand the long strain necessary for the insertion of a gold filling, or whose teeth are so frail that they would quickly break away under them.

In all these cases we have acted in the interest of the longest service of the tooth, independently of how the tooth may appear from the æsthetic standpoint.

I have carefully studied these conditions for fifteen years, and have tabulated every filling inserted so that a perfect record of date and kind of filling is at command from the diagrams. From these records it can be conclusively shown that no teeth, however frail or soft or predisposed to decay, need be lost if proper attention be given in each case. Hundreds

of such teeth can be shown which, under the older methods of practice in filling with gold or amalgam, were either lost entirely or crowned, and that now are strong and doing the best of service and giving such comfort as only the natural teeth can afford.

You may at times find opposition from your patients to the methods here outlined, but they can generally be converted by a careful explanation of the reasons for the practice and the results which will surely follow.

You cannot either please or satisfy every one who comes to you, and your duty to yourself and your patients is to do for them what you, in your better judgment, know to be best for them, and to allow the results of your operations to work out your justification and prove the value of your views.

In large approximal cavities in the incisors or cuspids, and compound ones in the bicuspid and molars, in those cases where, for various reasons, you do not wish to place a porcelain inlay, and where a gold filling would not stand, or the patient be able to undergo the operation, it is often advisable instead of crowning to make a gold inlay. You are all familiar with this operation, and I will not take time to describe it, but simply say that it has been eminently satisfactory both in appearance and tooth preservation.

I wish to make a strong plea for the use of gutta percha in all buccal cavities in molars. You are enabled to insert them with much less cutting, and therefore so much less pain and annoyance, and are sure that there will be no further decay. In this position they will last for years, and no matter how deep, allow no shock to come to the pulp through them. You will personally appreciate the saving on your nervous system and win the heartfelt thanks of your patients for the great saving in the pain of excavating these most sensitive places.

One of our hardest problems is the care of children's temporary teeth, not only in preserving them as long as possible, but in doing so in such a manner as not to frighten and disturb the child and make him fearful of your operations.

In the filling of these teeth, I have adopted the practice of using red gutta percha almost entirely, and where there are adjacent approximal cavities in the posterior teeth, to fill the space entirely. In this method the food does not press on the gums between the teeth, and comfort in eating is much promoted. If there should be subsequent death of the pulp, which often occurs owing to the abnormally large pulps in most of the deciduous teeth, and the filling must be removed, it is very easily and

almost painlessly done and quick relief afforded. Experience has proved that in a large percentage of cases, the gutta percha will remain until the time for the shedding of the teeth.

In some cases, in masticating surfaces, it is well to use the oxy-phosphate of copper cement, which is made by Dr. Ames of Chicago.

In my remarks I have tried to emphasize the methods employed in saving teeth, and not in filling them in the most artistic manner regardless of all else. You should not infer that the latter subject is unworthy and does not receive the attention it merits. The aim is to do every operation for the best and highest ultimate good of the patient, and where fillings can be inserted the first time that have a probability of ten years' service, which is the average life of a gold or amalgam filling, I most heartily approve of their immediate insertion in every case where other conditions, such as the health or indisposition of the patient does not render expedient a more temporary operation.

There are so many conditions which enter into every operation, however simple in itself, that a dogmatic statement of the best procedure in any given case, cannot be laid down unless all the conditions are known, and personal judgment must enter into each case.

The claim is also made that in following this method of practice, your patients will suffer less annoyance and pain between your operations, as they are less liable to have pulps die and abscesses form.

This subject of the best fillings for each case has been made a very careful study on its merits alone without any other consideration and has yielded results which have been very gratifying to myself and appreciated by my patients.

It is comforting in the highest and most unselfish degree to know that labor faithfully and conscientiously performed brings its own reward and the inner consciousness that your work has been along the line of benefitting your fellowman and advancing the standard of the profession of which you are a member.



Boston and Tufts Dental Alumni Association.

Discussion of Dr. Peirce's Paper.

Dr. Geo. H. Bates. I have enjoyed the reading of the paper exceedingly, and it opens many questions and suggestions.

In considering use and disuse as factors of evolution, it must be recognized that while conditions in the life and structure of animals seem to point with certainty to such a conclusion, there arises fundamentally the question of origins.

Before the factors of use and disuse can exert an influence, organs to be modified by their action must have an existence.

How did organs come to be what they are? What was the first inception of the conditions which eventually resulted in the physical equipment of animals for the work of life?

Two answers are at hand for these questions. First, development in answer to changing environment. Second, growth and amplification of fortunate variations by natural selection. This brings us to the postulate of Charles Darwin.

I wish to speak in amplification, not in criticism, of what Dr. Peirce has so well said.

Most of us are not old enough to remember when Charles Darwin published his epoch-making book, "The Origin of Species." Some are, however, and may call to mind how the world was stirred, not only in scientific circles, but among thinking people everywhere. The Germans accepted him at once, only to reject later, since which time they have been coming into line, until now his views in some form are accepted in all circles of biological science in that country of science and students. This has been the outcome as well in the popular mind, until now we are hearing of evolution even from the pulpit.

Lamarck preceded Darwin by half a century. He did not have opportunity for the extensive and exhaustive observation which Darwin enjoyed. He was also much handicapped by Cuvier, who thoroughly and cordially disbelieved in Lamarck's conclusions. Great anatomist and eminent scientist as he was, he failed to grasp the great truth which had shone in upon the mind of his fellow worker. Darwin, too, ignored, in the main, the work of this distinguished French seer. It remained for an American, the late Edward D. Cope, of Philadelphia, to bring to the recognition of the world the importance of the work of Lamarck.

The theory of natural selection by Charles Darwin is based upon the law of variation. I am sure you have all observed the tendency of animals and plants to endless variation. Bateson has given an extensive treatise on this subject in his volume entitled "Materials for the Study of Variation," in which he shows not only how great the number of variations is, but how every part of the organism is subject to these seemingly accident freaks of structure.

Natural selection means that nature selects whatever is for the good of the organism or race, and not only perpetuates but builds upon it. This means that any one, out of the endless variations in the animal body, which will in any way best minister to the good of the individual is seized upon by nature and started on its way in progressive evolution to completion and perfection of functional possibility.

The question as to whether the organ comes *de novo* in answer to changing environment, or whether it is simply the result of natural selection upon accidental favorable variation is an open one, and, in the present state of knowledge, cannot be answered. Enough is known, however, to make men of science shy of radical statement as to factors in evolution. As Dr. Peirce has so well said, "We must suspend judgment and wait for more light." Prof. H. F. Osborn, who, with Professor Scott, has done so much in the line of study of tooth evolution, in an article in *The American Naturalist* says, "In the present state of uncertainty concerning factors, it is well for scientific men to be exceedingly conservative."

Dr. Peirce has taken an illustration of modification of structure by function, the single cone tooth being developed into a form with three cusps.

Evolution of Tooth Forms.

The first animal known to have had this three-coned form of tooth was the dromatherium, which appeared in the upper triassic. It was a small animal, probably a marsupial. If I might use the diagram of Dr. Peirce, you will see by this figure that the central cone is much the largest and highest, and that the lateral denticles are very

small. The reptilian cone, or haplodont tooth, is here being transformed into the triconodont, or tooth with three cones in line.

In this figure, which illustrates the jaw of the dolphin, we have an illustration of the condition in a mouth having haplodont teeth (although in this particular case the tooth is a degenerate and has reverted to type in the process, as has the tooth of the whale). Here the upper teeth cut in between and somewhat outside the under. Just here the question arises, Did the denticles on the sides of the reptilian cone come in answer to, or because of, the attempt of some ancient animal form to use these teeth for mastication, or did some individual have a variation which, taken hold upon by natural selection in time produced these denticles, which, in turn, became triconodont teeth.

I would say just here that we are dealing with unlimited time. Dana has told us that "it required three hundred and fifty millions of years to fit this earth for the first speck of life." This statement, I think, will suggest that there is no hurry, or at least that nature is in no hurry. We must not get the notion that these changes have taken place in the lifetime of an individual, nor in an age; we are dealing with abysses of time.

The next stage in the evolution of the tooth was the tri-tubercular form. It will be seen that opposing triconodont teeth crushing in between each other, that is to say, the upper crushing in between the lower would bring the lateral cones in contact, while the long central cone would not be opposed. This would result in change of position in the lateral cones, forcing the upper ones out and the under ones in, thus making two triangles formed of three cones each. The upper would have its base turned outward, while the base of the lower one would be turned in. These triangles working by each other make a shear so useful in cutting that this form of tooth has been retained by many animals.

In the jurassic a talon was added to the posterior side of the triangle in the mouths of most trituberculates which bore three cusps. This is the condition today with the teeth of the carnivora, and was characteristic of the cretaceous. The cusps of the trigonon gradually reduced in height until they were uniform with those of the talon, and the cones were transformed into tubercles, making a tubercular tooth. It will be seen by observation on the present condition in the mouth of man that the superior molar has lost two cusps, while the lower molar has lost one, making the former a quadritubercular tooth, while the latter is a quinquetubercular tooth. The trigon in the human molar may be seen, particularly in the superior molar in front, or mesially, of the posterior cusps. It will also be seen that the third molar is a degenerate tooth, and that the degeneration has been parallel, resulting in a quadritubercular crown for the lower and a tritubercular crown for the upper. Degeneration inverts the order

of evolution, and the condition just cited beautifully illustrates the law set down by Darwin, namely, "that organs and individuals in the process of degeneration revert to type."

It is an interesting fact that during the upper jurassic, cretaceous and basal eocene all the molar teeth were tritubercular, and another interesting fact comes from the side of embryology, that is, every molar tooth has in its early development three cusps in a triangle and three points of calcification. This latter condition is in line with the general law of embryology, viz., that the animal in his ontological development exhibits every phase of life represented by the forms below him in the phylum to which he belongs.

Now as to the questions of factors in evolution.

Heredity.

Is it use and disuse, or natural selection, or some more subtle factor which is not yet known? We must put a question mark after this. There is one law, however, which must come up for consideration, viz., the law of heredity, or inheritance. How is it that the offspring resembles the parent? This opens up the whole field of discussion now taking place in the biological world. Darwin saw its importance and erected his theory of pangenesis. He said "that every cell in the body contributes a part of its substance to the germ cell. That cells gave off what he called gemmules, which are incorporated into the body of the germ cell, and that they have unconscious memory by which in the process of development they reproduced, or imitated, the cell from which they originated."

This raises another question involved in the theory of August Weismann, viz., "Are acquired characters inherited?" Dr. Peirce spoke of the arm of the blacksmith. It is quite true that his constant exercise may produce a strong, heavy arm, but his son may have a puny arm. The blacksmith cannot transmit to his son his acquired character in his enlarged member. It is said that the contention of the Weismannian School has been set aside, but there are many things yet to be explained, and we have not heard the last of August Weismann.

Those who would cavil at the idea of evolution, and there are many such, absurd as it may seem, after all that has been discovered, claim that the chasm between man and the lower animals has not been bridged. It has been bridged. It has been bridged by the teeth. It has been bridged by the foot, by the uro-genital organs and by the digestive tract. We do not need to find the missing link.

In attempting to account for the varied conditions of nature, as they are experienced, no one factor can be considered alone, and if we say use and disuse, we must put natural selection behind it. But the best answer to the question, I think, is "I do not know."

I have been more than pleased with the response which Dr. Bates has given to my paper. He is a dentist and so well versed in scientific matters, and he so fully appreciates the subject under discussion.

Dr. Peirce.

I must thank my friend, Dr. Shepherd, for the compliment he has paid me; he knows so well how to make one feel comfortable.

If I had written my paper within the last three days, instead of three or four weeks ago, I should have modified it in some respects. Recently we have had a meeting of scientific men in Philadelphia, and there I listened to a paper read by a Princeton professor, in which he stated that the teeth of the present armadillos had so degenerated that they had a mere line in place of a normal tooth. I said to him: "Professor, you recognize that the ancestors had a well developed enameled tooth. Do you consider that absence in function had made that change?" "Not a bit of it," he replied. "I do not accept the theory of use and disuse. I do not know the factor that has modified the teeth of the armadillo; that change has taken place in the individual from use and disuse is true, but that this modification is transmitted is doubtful." I said: "We have blooded horses, and they have progeny endowed with their higher or valuable peculiarities, and these they are supposed to have inherited. Why that inheritance?" He replied: "I do not believe that acquired characters and mutilations are inherited, and when any one asks me the cause of degeneration I say, 'I do not know.'" So I say, had I written my paper within three or four days, instead of some weeks ago, I should have modified it to some extent, but I am still quite firm in my conviction that absence of function is an important factor in modification, and when that condition is present all succeeding generations are affected by this degeneration. Mutilations are not transmitted, but I recognize the change that takes place in animals from their environment and diet. I have had a family under my care consisting of three children with soft, spongy gums, and the tissue down over the crown of the tooth. I suggested that these children in going to the table drink a glass of milk or water and bolt their food in five minutes, when they ought to spend fifteen or twenty. The mother admitted that they did. I told her before anything was done for them I wanted them to go without drink at meals and eat their food dry. You can only imagine the change that took place in a short time in the mouths of those children in the solidity of the gums. Friction and absence of moisture with food accomplished the improvement. Things that are so important a factor in the life of the individual must be transmitted, provided they are of equal interest to succeeding generations.

That the diversion of nutrition is to benefit some organs at the expense of others is certainly true.

Changes that are taking place are largely an unconscious effort that may be exerted in several directions, atrophy of those unused, and the strengthening of those most used. Beginning in the individual they soon pass by inheritance into the family or race. We have but to alter environment to alter endowments. The fundamental law of life in organic forms is the relative ability to adapt themselves to environment. Atrophy and regression are an essential process of progressive evolution so that nutrition may be diverted to useful organs.

Now, I have to thank you all very much for the attention that you have given my paper and the very great pleasure I have had in being with you on this occasion.

Central Dental Association of Northern New Jersey.

April Meeting.

Discussion of Dr. Irwin's Paper.

Dr. Irwin is certainly entitled to a very great deal of credit for the time he has spent and the labor he has taken in preparing this paper and collating the facts that he has presented to us.

It is quite apparent from the reports received by him that it is a very divided question.

A great deal of improvement might be made by instruction in the public schools. I venture to say that I can go out on the streets of this intelligent city, or of any other equally intelligent city, and from the ordinary passersby take one hundred individuals, male and female, intelligent or otherwise, as they may come to my selection, and that nine out of ten of them could not tell how many teeth a child has; neither could they tell how many constitute a full set of an adult person. Equally true is it that nine out of ten of these people, if it happens that a six-year-old molar of a child has become so carious as to cause trouble and pain to that child, will say to you: "Extract this tooth, because it is a first tooth." Every one of you gentlemen know that this is a fact, and that they look at you in perfect astonishment when you tell them that is the first molar of the second set, and scarcely believe you. That information could be imparted to the community through the public schools, and in the beginning of the children's lives, and they would know more than their parents do today, viz., how to take care of their teeth. Furthermore, nine out of

ten of these same people, when they get a toothache, come to you and say "Destroy the nerve of this tooth," thinking that the tooth can never ache again; that it is utterly impossible for a dead tooth to ache! That is the common opinion of the public, even those who have passed through the public schools. We know how erroneous such a notion is, and that a pulpless tooth is ten times more liable to ache than a live one. Yet such is the notion prevalent in the community, and it would be well if, through the public schools, or through any channel, this dreadful ignorance of the people could be corrected, and I do not know but Dr. Irwin's idea of having a public instructor is the right one.

There are many questions entering into this subject. The moment you offer your services free, where are you to draw the line, and where, in this country, is there anybody who will have the services of a dentist free? They are above that; they do not want it. You cannot go out in the community of this great free land of ours and find people who are poor enough to submit to have the dentist do the work for nothing. The very minute you touch on a man's poverty he flares up, and he says: "I can pay for work. I am able to get good wages—\$5 a day for a plasterer, \$4 a day for a carpenter. I can pay for what I want." If we attempted to send the people in the public schools to the public dentists, their parents would say: "No; I can go to Dr. Osmun, or Dr. Sutphen, or Dr. Meeker, or anybody else that I choose. I don't want your public man to fill my children's teeth; I am not as poor as that. I can pay my way through life. I am an independent man, an American, and I don't want any of your help in that line." I do not believe it will be practical to do public dental work, but it may be practical to educate the public school children by giving them the proper instruction.

Dental service in the army I can see is a very wise thing. The men there are doing good service for the country; they may be in some distant part away from a dentist, and should have an opportunity of receiving proper treatment. It is equally proper that the navy should have official dentists, but—I don't know if I am right or not, perhaps Dr. Irwin can tell me—I understand that the army dentist does not stand on an equality with the physician.

Dr. Irwin.

No, he does not.

Dr. Stockton.

He ought to; he ought to stand in the same position as that of a physician in the army and navy. If he is equally educated, as a dentist, as a physician is, he ought to stand on the same plane, rendering the same service to a man who is sick in his teeth or mouth as a physician does to one who is sick in his body. (Applause.)

I do not think the majority of members really
Dr. Chas. S. Meeker. appreciate the hard work that Dr. Irwin has done in compiling these statistics. From my experience with Dr. Irwin, in Paris, I know what a worker he is; how he visited the many institutions there and sought information from all the English-speaking people that he could find, in order to get information, and how afterwards he went to London and worked equally hard there, and I believe the value of this paper will be more forcibly brought to our minds when we read it in the *ITEMS OF INTEREST*, and have leisure to look over it thoroughly.

I am an optimist in the idea of the rise of the dental profession. I believe it will continue to rise and go forward, and I believe that Dr. Irwin is right in his idea, just as it was one of the entering wedges in the advance of our profession when a dentist was made a contract-surgeon in the United States Army. It is a question of but a few years, a matter of evolution, when the dentist will take his proper position, socially and professionally, in the United States army.

It was along this line of thought that I introduced a resolution at our last meeting by which this society put itself on record as being in favor of the employment of dentists in the United States navy. From what I saw of American dentists in France and England, and from what I know of them in this country, I am convinced that the American dentist is, *par excellence*, the dentist of the world. (Applause.) That is proved by the positions they have obtained in England, on the Continent, and even in Manila, China and Japan. This suggestion of the essayist is another entering wedge. Forty-five hundred dentists graduated from the colleges of this country last year, and they have their living to get; those who are not fitted for their business will have to go into other walks of life, but the dentist having his profession at heart will rise and will act as an educator amongst those with whom he comes in contact.

Every dentist, at some time in his life, may become a martyr to the work that he has before him, and Dr. Irwin is a martyr in bringing forward this subject, and we should be martyrs in trying to educate the public to the idea that the coming generations of the people, as well as the coming generation of dentists, should be educated more thoroughly so that in future the dental organs of the people shall be kept in better condition, for we know that a good masticatory apparatus is a potent factor of good health, and good health means a further increase of population, thus adding to the growth and prosperity of these great United States. (Applause.)

Dr. Stockton.

Why do you say a martyr? Why do you not say a hero?

I am afraid we are not all heroes. This is a new idea that Dr. Irwin has advanced, and the members of the Central Dental Association of Northern New Jersey, independent as we are known to be throughout the world, and willing to be the sponsors of and to help advance anything new or useful, should by their example and precept help to spread it and to educate the masses, the people who are hereafter to enter the profession of dentistry, so that in times to come Bellamy's ideas may be exemplified in the dental profession, and its members be amongst the elect in this country.

It seems to me that in communities where boards of dental and medical examiners exist there is a good opportunity for carrying out some of Dr. Irwin's ideas. Some of those who have responded to Dr. Irwin's questions have said that they had dental examiners or medical examiners whose duty it was to prepare charts of the mouths of the children to be presented to the parents. As I understand it, the medical examiner, in the beginning of his career as such, in the various districts, established about the same precedent. He had the privilege of recommending to the family that certain medical attendance was required, and it was suggested in the beginning that vaccination should be compulsory. Today in New York City, and I think it must be true of New Jersey, it is compulsory, when so recommended, that the child be vaccinated. In New York City the child's hygienic condition is looked into by the medical examiner, and the examiners particularly observe whether any vermin be present. If the dental examiners in the various counties would assume the duty of giving the parents to understand that it was somewhat compulsory that dental service be rendered these children in the various directions that might be indicated on the chart, the parents would naturally pay some attention to that. If it is simply suggested to them, without any force or any authority being applied to the remarks as conveyed in the charts, the parents are very liable not to give it any great consideration. I think that could be done in this state, if that thought was brought to bear upon the minds of medical examiners and dental examiners. I, for one, have endeavored to do that with two friends who are medical examiners in the schools in New York City; I have asked them to impress upon those with whom they come in contact the necessity of dental work, and to give some force to the instructions that they send home by the children, and they tell me it has produced some fruit already. I do not see why it should not bear more as time progresses.

The essayist has presented tonight a most excellent paper setting forth theories that are more or less familiar to the minds of most of us. As Dr. Stockton

says, theoretically he is correct, but as a matter of practice I am afraid it will be many long years before we will be able to realize actual results. I have tried hard in the public school systems of this city and of the adjacent cities to secure something upon which to base my hope that we might have an examination of the children's teeth, but without success. In some schools there is a studying of oral hygiene and physiology, but it is sadly neglected. It is not a long time since we had appointed in this city medical inspectors, whose duties are to examine the children and indicate the presence of disease, but you cannot prevail upon these men to devote any time whatever to dentistry or to the examination of children's mouths. They do not care to encroach on the domains of the dentist, and you could not get them to recommend that the children have their teeth taken care of. I have talked with several of them and could get no satisfaction whatever. I have suggested that it might be well to have lectures delivered by some one to the children, perhaps a half an hour in each class during the term. This would be of the very greatest benefit, not only to the children, but to future generations. That they are woefully ignorant on the subject goes without saying. We have tried in years gone by to bring about some method whereby there could be had dental education in the public schools. The minute a man seeks to advance in that direction, however, it is immediately suggested that he is endeavoring to put himself forward in an advertising way. At present I see no remedy whatever; I wish I might.

But let me commend the essayist and state my belief that out of this essay will come forth some good. He has read one of the best papers we have ever heard, and he deserves the sincere thanks of this society.

There are two points in the paper about which
Dr. J. Allen Osmun. I have had some little thought and some little experience. The first is that I have but little faith in the so-called dental inspector. I do not think this is the way to overcome the evil, by dental legislation or things of that kind, but I think we can do a great deal by education, and that the starting point should be in the school, not only the public schools, but all the schools, and that every dentist who is a member of any society all over the United States should give a dental lecture in some one of the schools; that they should take regular service and be appointed by a society, and that would take away the idea that they were seeking to advertise themselves. They should take up the theme that they feel themselves competent to speak upon. Then the day of the disappearance of dental parlors will dawn—as soon as you get the people educated; they go to such places because they know no better; they are to be pitied and not condemned.

I served four years in the United States navy, and I know how sailors

on long voyages suffer where they have no dental service. The only thing they can do is to go down to "sick bay," where the turnkey is most unmercifully applied. I sacrificed four of my teeth there, and if there is any place on God's foot-stool where dentists are needed, it is in the United States navy.

I commend Dr. Irwin's paper, and shall carefully read it when it is published.

This is a paper that almost any one should be able to say something upon, because I believe that every member of this society is very much interested in the subject.

There can be no question but that great good could be done if provisions such as outlined in the paper could be carried out, and we are under great obligations to Dr. Irwin for going to the trouble he has in preparing this paper for us. I have been stimulated by its reading.

When we come to consider the basis for erecting any public structure we recognize immediately that it is ignorance we have to contend with. Not infrequently parents will bring children to us suffering with their first molars, and will tell us they thought those teeth belonged to the temporary set. There we have an opportunity of instructing the parents. But we have a much larger field when we come in contact with the public school teachers. I have found several school teachers with whom I have come in contact very anxious to know everything about the children's teeth that could be told them; they will look up literature suggested for their reading and prepare themselves carefully for the instruction of the children placed in their care, in that direction. I have found this a source of much good, and I have had children come to me from schools where intelligent teachers have examined the mouths of children who complained of pain, have noticed carious teeth and written to the parents suggesting that the child be sent to the dentist.

I believe it would be impracticable to compel children to go to any particular dentist. I think if an examination could be made and a chart sent home to the parents showing that certain work was needed, that work would, in a large majority of cases, receive careful attention.

As Dr. Stockton has said, the spirit of the American workman who commands a high price for his labor will not tolerate dictation, and he naturally feels he ought to have the opportunity of selecting his own dentist.

I have given this subject a great deal of thought, and have talked it over with some few physicians who are interested in the work of the hospitals of this city, and they have all unanimously agreed that public dental service

is at present out of the question. They appreciate the value of it and are fully aware of the necessity existing for it, but they do not think the time is ripe for anything to be done in that direction. Personally I think our greatest opportunity is in educating those who come under our care as to the necessity of more careful consideration of the teeth of those under their charge. That education is very limited, but here and there we can put in a word which might bear fruit.

For a number of years I have been in the habit of talking on this subject to public school teachers who have come under my care, and I am very glad to say that many of them in their informal talks to their scholars have impressed on them the necessity for a careful brushing of the teeth, and, where the occasion warrants it, placing themselves under the care of a dentist.

I was very much interested in the paper of Dr. Irwin. I am afraid it is almost Utopian, and that we shall not live to see it carried out to its fullest completion. But it is a great advance in the right direction, and I wish to thank him for the care and thought he has given to the subject.

I do not think Dr. Irwin's paper is practical in its entirety; a good deal of it is practical, but he is far in advance of the time. Our greatest difficulty, it seems to me, lies in the fact that the dental profession is not recognized as it should be, and we must obtain more recognition before we can carry out some of the ideas Dr. Irwin has outlined. It is said that the dentist is not recognized as being on a par with the surgeon. That is possible. I am largely interested in dental surgery and hospital work, more so than in schools at the present time, and I believe we must secure recognition in the medical profession and in the hospitals, as a first step, and before we try to get compulsory public dental service. Lectures on oral surgery are very well as far as they go, but I do not think we can go any further until we are recognized as on a par with the surgeon.

The trouble with hospital work is that the dental surgeon is not allowed a place on the staff. The New York State Society at its last annual meeting appointed a committee to look into that matter, which committee are to report next month. But I believe that where we can get entrance into hospitals it would be a good plan to do so, and prove by our work the value of our services, and then demand recognition. I would propose that where we are in hospitals we serve for a certain length of time and then demand a position on the staff or withdraw. If our services are worth anything they will give us recognition. I am associated as assistant in the Kings County Hospital. Dr. Russel, the head of the dental department which comes under the special surgical division, is an M.D., practicing medicine, and he is recognized on the staff the same

as any of the surgeons and has a voice and a vote. Their rules provide that the head of the dental department must be an M.D. I am just proud enough and independent enough that I would not serve even as an assistant in any institution having rules of that kind, excepting that we have not proved our value, and it is because of that I would recommend serving in such institutions for a stated length of time, which might be decided upon by our society, and if we are not then recognized, to withdraw. I believe that would be an entering wedge, and then we could go on to the public school work if we chose to, because that would familiarize the public more with the dental surgeon, and if he secures this recognition he would have more influence to get in the public school work.

Dr. W. P. Richards. Dr. Gould mentions that he is associated with the hospital, and that his name is not in any way connected with the staff. I would like to ask whether his name is mentioned in the annual report?

Dr. Gould. It is mentioned, as an assistant in the dental department.

Dr. Richards. I have the honor of being dentist to the Orange Hospital and have been for a great many years, and my name is mentioned in that way, in the annual report of the hospital—and also in the dispensary.

Dr. Gould. We are recognized in that way, but only as an assistant.

Dr. J. W. Fisher. I have enjoyed Dr. Irwin's paper very much, but his theories are a little different from mine. Some time ago I read in a dental journal an account of how ignorant are the physiologists who write the textbooks for the schools; that in many such works there is not more than a page or two on the subject of dentistry, and that the teachings are those of fifty years ago, and I think there should be some way of getting the publishers of such books to put in something pertaining to dentistry that would be elementary somewhat, that a child could understand.

I do not think the idea of an instructor or lecturer to a public school would be feasible at all, because while the speaker might be acceptable to the parents of some of the children, he might not be to some of the others.

Dr. Alphonso Irwin. There has not been a word said by any one that I would not have liked to answer. I am very much interested in what has been said, and all have thrown light on the subject, but I cannot go over it all.

I will say, however, that while Doctor Stockton tells the truth when he says the proposition is a theory in the United States, still, let me tell

Dr. Stockton that it is a fact in Great Britain; it is an established fact there, not only in the army and navy, but also in the public schools. Concerning Dr. Osmun's remarks let me say that the culminating idea of my paper was this: "Give me the 15,443,462 public school children of the United States, and I will carry out any reform, correct any abuse, and rule this nation. Professionally speaking, give me the school children of this country, and I will annihilate the dental parlor, rob quackery of its victims, solve state examining board problems, win the eternal gratitude of dental faculties, and raise the dental profession upon the highest pinnacle of public favor." (Loud applause.)

Southern Dental Society of New Jersey.

April Meeting.

After reading of the report of the treasurer and adopting same together with motion to pay certain bills presented, the Society listened to a paper by Dr. H. S. Sutphen on the subject of "Conservative Filling for Teeth Preservation." Dr. Sutphen prefaced the paper with the following words:

Dr. Sutphen. I am very happy to be with you tonight. I remember a few years ago my dear friend, Dr. J. Foster Flagg, said in an address before the boys that he was a Jersey man and that he loved New Jersey. It was the place of his nativity, and he loved all that was in New Jersey; he even loved the shad that swam in the Delaware River along the Jersey shore. I am a little in that position tonight. Through the courtesy of your members I have been dining with you on shad. I have always liked shad and I can assure you my appreciation of shad and liking of it is in no way diminished.

In connection with his paper Dr. Sutphen related the following incident:

A month or so ago I attended a meeting of the New York Odontological Society, and before the meeting opened I was conversing with two or three of the gentlemen present, and one of them, an eminent man, said: "I had a patient come recently under my care, who came from a celebrated

man in New York. Her teeth were very badly decayed in the buccal and lingual surfaces. Every kind of filling put into those teeth failed in a very short time and I made to her this proposition—I said, 'I will put into the teeth one filling of every kind and we will see which wears the best.' He tried gold, amalgam, cement and gutta percha and said that to his astonishment the gutta percha was the only one that survived and maintained the structure of the tooth. I was surprised that he, who is a skilled and eminent practitioner, did not know that gutta percha was the most sure to last. He seemed to regard it as a great discovery. I made no comment, thinking that comment was unnecessary.

Discussion of Dr. Sutphen's Paper.

Dr. Duffield.

I would like to ask the Doctor about the use of base plate gutta percha. He stated in his paper he is using red base plate gutta percha exclusively. I would like to know if in his tabulated records, he finds any difference in the wearing qualities between the red and the white, and which is the superior. I myself think gutta percha one of the most valuable materials the profession has today. Referring to fillings in buccal and lingual cavities, I have had a case similar to the one mentioned. The patient was a lady; her teeth much below normal in structure. She had been going to an eminent man who had filled the teeth in the most skilful manner, but always with gold or cement. They lasted about a year and a half. There were immense cavities in the labial surfaces of the six lower teeth. I filled them with gutta percha and, though they are not very handsome, those gutta percha fillings are still doing good service and are saving those teeth.

Dr. Sutphen.

The red gutta percha is more quickly and easily manipulated. You can take one large mass and almost press it in with your fingers and then take off the surplus afterwards; whereas with the high heat white gutta percha you need to be more careful; it seems to give the patient discomfort. The only idea of using the red is the comfort of the patient.

I would say that in my experience the difficulty has always been that we are practically unable to get two lots of the same quality. I had, I presume, two ounces of Flagg's high heat gutta percha which he made some sixteen years ago, which he knew was very superior to any he had been able to make afterwards; but it was explained that of the material obtained from the manufacturer there would be certain parts which would contain a very superior quality of gutta percha and the rest not

quite so good, and it just happened that in this lot the quality was superior to what had been obtainable under general conditions.

During the reading of the paper some statements made by Dr. J. Foster Flagg occurred to me, the burden of which was that he had seen gutta percha fillings put into buccal surfaces of the lower molars and remain in there forty years and preserve the tooth so it was in good condition at the end of that time. This statement may seem surprising but it is only one of the surprising things connected with the use of gutta percha. I consider it an invaluable filling material. I consider that Caulk's is the best high heat gutta percha we know of at the present time. Dr. J. Foster Flagg has stated, and I know generally that other dentists have said, that Hill's stopping was incalculably the best gutta percha ever put on the market. Unfortunately, Hill died and the preparation died with him. Since then no gutta percha ever has been put on the market equal to the genuine Hill's stopping. I have used pink gutta percha more than any other, particularly in filling children's teeth, and can verify Dr. Sutphen's statement in regard to its being probably the most useful preparation we have for the back teeth of children or elderly people. I have put in as many as nine gold fillings in buccal surfaces of lower teeth for one person at a series of sittings. Of course those cases were selected cases. Those gold fillings have done a great many years of service; they have preserved the teeth; but, taking it altogether, there is no filling material, whether gold, amalgam, tin foil or any other material that compares with gutta percha, for filling buccal and labial cavities in the teeth of children and those persons past middle age.

Dr. Sutphen was exceedingly conservative. His paper hardly leaves me anything to say, for the reason that I agree with him perfectly except in some slight methods of procedure. In his preference for gutta percha I certainly agree with him. I may do a little differently in some one or two matters; for instance, in children's teeth, where much exposure of the pulp is found I have used a preparation of pheno banum. I do not use it exactly according to the directions. It is a preparation of carbolic acid and oxide of zinc and I think there must also be some sedative in it. Lay it in the cavity over the pulp, and not all the amalgam or cement in the United States can equal it. In six years I have had no report of any pain or ache in teeth so treated. I think Dr. Sutphen was in my office one day when I treated a patient, a young lady; the tooth was a sixth-year molar, where the pulp was exposed and the dentine I took out mostly a disintegrated mass of decay. I have never seen the patient since, and that is pretty good evidence of the success of the work. The parents

have been to me since and the bill has been paid. If there had been anything wrong I should have heard of it very quickly. I think this preparation better for pain than the jodo formogen cement. I have used that, but I found afterwards it has given pain and I discontinued the use of it, especially for children's teeth.

**Dr. Chase,
Philadelphia.**

I do not know that I can say anything to add to Dr. Sutphen's paper, as he has covered the ground pretty thoroughly, but I do not see why he has left out tin. There are undoubtedly cases in which it is the best thing to use in buccal cavities. I do not exactly understand wherein and in what manner zinc phosphate hardens or solidifies the dentine. I do not think he quite meant exactly what he stated. If he did, I have learned something I did not know before. So far as the use of gutta percha is concerned, he is undoubtedly right. I think if all of us would use it a little more instead of trying to put in material by use of which we think we can get a little more money from the patient, we would preserve more teeth. In reference to the use of the white or red, I have never used much of the white, preferring the red as likely to last better. There is one thing I have noticed. We do not find that disintegration upon the surface of the filling with red that you do in the white. The reference to treatment of lining of cavities for the purpose of protecting the pulps is undoubtedly good, and I suppose every dentist practices it in some form. A patient once said to me, "Doctor, I am very glad you never inquire of me what kind of filling I want. What difference does it make to me so long as you fill them all right?" I told him he was right about that. But there is one patient I know I have always had to go into a long tale of the whys and the wherefores, but I have always made it a practice never to argue with patients. If they have not enough confidence in me to think I know what is best for their teeth, they have no business to come to me.

The subject of tin undoubtedly does not receive the attention at the hand of present day dentists that it deserves. I do not think there is any filling in teeth wherein it should be placed—wherein caries has gone on to a great extent—that will save the teeth so long and well, as a good, properly inserted tin filling. There is another purpose for which I use the red gutta percha; where the cavities are very deep, the pulp in danger of being exposed, or chance of subsequent trouble, I always put in the red to serve as a signal. When the patient comes again I do not have to refer to my records. I can tell immediately. Here is the danger signal, while the tooth is still preserved. I do not disturb it. Someone has spoken of a filling remaining forty years. Dr. Meeker was telling me tonight that a gentleman came to him when in Ohio long ago with a red gutta

percha filling—from the time of his coming it must have been thirty or more years. He didn't disturb it, added a little more to it and sent the gentleman on his way rejoicing.

My experience has been one leading me to be
Dr. Gregory. not a very earnest advocate of gutta percha except for temporary purposes. I should not select it at all for some of the conditions Dr. Sutphen has laid great stress upon. If I find a very deep-seated cavity, with the pulp affected by decay, I should think that the last place to use it. I would rather treat it in a different manner, for my experience has been that when the deep-seated cavity is lined with gutta percha, the expansion exerts a pressure upon the thin layer of dentine that is likely to make trouble. I have not found gutta percha a very valuable material to use in the mouths of courageous patients. There is no better material to be employed, in my opinion, for people who are careless about their teeth, or people we do not desire in our practice—give them gutta percha every time, because it takes only a few minutes and it will protect those teeth better than any other material. I do not like to be rude to my patients; when it comes to some of those buccal cavities I tell them perhaps, "I'm afraid your tooth brush is too large for you to get back quite far enough." I try not to treat them in a rude manner, but I give them to understand that they do not brush these surfaces. I am not casting any reflections upon you gentlemen here, and especially Dr. Sutphen and Dr. Meeker, for I have the highest respect for these practitioners personally; have seen some of the work these gentlemen have done, and it was all excellent, but in my experience, in my hands, gutta percha does not accomplish enough and I would rather treat children's teeth in a different way, than as described in the paper. Then, from an esthetic view, I think it is abominable; the tendency is for gutta percha fillings to show discoloration.

The only thing I have to say is that I find the
Dr. Deal. heating of the gutta percha interferes with its durability. If you will heat your instrument and press it in, it will last longer. Heating the gutta percha spoils it. Heat your instrument and save the gutta percha.

I want to speak of the expansion. Once I had
Dr. Peck, a disastrous experience. It was a lower molar tooth. I destroyed the pulp and filled the molar with gutta percha. Of course the walls were not very strong and possibly I left it a little too full, but, within a week I think, that tooth split in two from the expansion of the gutta percha. I think Dr. Bonwill used gutta percha to separate teeth by its expansion.

I am always pleased to hear anything about the filling of teeth, and since the subject of gutta percha has come up I want to say that I have been doing some thinking along that line recently. I happened to be in a place where I could get some pure gutta percha, and I got two or three pounds to experiment with. I am going to turn it over to the chemist I have in my employ. I know there is different coloring matter used in gutta percha, but here is a pure piece that I want to pass around. What the red gutta percha is colored with and what the principle about it is, I do not know, nor what in the white, but I am going to find out and I will tell you that later on, but here is the pure article. It is more like rubber than gutta percha; but gutta percha itself is absolutely impervious to moisture. If you can get it hard enough, in a form that does not expand—I have seen it—if you can get that you may learn something yet about gutta percha.

Tin is very valuable, but in a paper of this kind
Dr. Surphen. it is almost impossible to touch on every subject involved.

In regard to the oxy-phosphate hardening the teeth I have simply noticed in all my practice that the oxy-phosphate does have that effect. I would like to get at the principle. I agree in regard to the danger signal, but I do not use the red gutta percha for that purpose; in my records I invariably indicate such cases on the diagram. For instance, if a patient comes and says, "I have had considerable pain on this side," I would almost invariably consult my diagram and I would see that a certain tooth was filled and its condition was perhaps doubtful at the time. My diagram gives the danger signal better than the gutta percha.

I do not think I could make a stronger plea for the preservative power of the gutta percha than in what has been said in regard to those patients who come in who do not take care of their teeth. What better recommendation would you want than that? Those are the teeth hard to preserve. I was not talking from the esthetic but from the preservative standpoint. I think Dr. Gregory misunderstands me as to using the gutta percha in cases of deep-seated caries where there is inflammation or danger to the pulp. Certainly I would not put the gutta percha into those cavities without some other precaution. There is, however, a good chance for our friend Dr. Gregory to educate the patient who comes to him with a molar in such a condition. As to over-heating, a great deal depends on manipulation. Like many other things we do, we should know how to do it.

As far as discoloration of the gutta percha is concerned, in many—I might say all but one of my cases, I have had, I think the discoloration had nothing to do with the heating. It may be perfectly brown, not from the heat but from the action of the saliva.

Gutta percha is a subject to be studied independently of everything else. Study the manipulation of gutta percha. I fear very little from its expansion that has been such a bug-bear with many. It has expansiveness, but if there has been proper manipulation you will have very little trouble on that score.

Central Dental Association of Northern New Jersey.

May Meeting.

The regular monthly meeting of the Central Dental Association was held at Davis's Parlors, Newark, N. J., Saturday evening, May 17, 1902.

The President called upon members to relate any instances of office practice which might be of interest to the profession.

I have something which seems to illustrate a
Dr. W. P. Richards. piece of carelessness on the part of a physician.

The model which I now offer is from an impression taken on the right side of the mouth where the first and second bicuspids, the first molar and the second molar were all in splendid condition. The patient came to me to have the right upper molar extracted. I found it very loose and discovered large accumulations of tartar and the gums in a very much inflamed condition therefrom. Upon performing the operation I found quite a cavity in the roof into which I extended my finger quite a long way—he said he could feel it under his eye. He told me he had been in the hands of a physician who had given him mouth washes and syringed his mouth out and advised him to come to me. The patient was a short, thick set man, in good health and good circulation, which was probably the only thing which kept him from having serious trouble. With a pair of forceps I removed this piece of bone (producing same). It is the floor of the antrum. After washing out the cavity thoroughly I inserted a small piece of sponge in it with a little iodoform on it together with some carbolic acid; I pushed it up as far as I could and told him to come back in a day or two. I did that in order that I might see if there was any more necrosed bone. I found the walls very much black-

ened, and I chiseled off considerable, taking out another piece of bone, which I have now lost.

Dr. Luckey. Can you give us any idea of the origin of the trouble?

Dr. Richards. Salivary calculus working up under the gum, causing inflammation.

Dr. Luckey. Do you not think it was due to some injury?

Dr. Richards. No; I asked the patient if he had ever had an accident of any kind, and he said no, and he came to me a perfectly healthy subject. He was a man

who I should think drank a great deal of beer. There was no sign of syphilis, and I am really at a loss to know the cause. There was no decay in any of the teeth; they were large, strong, healthy teeth in perfect condition.

Dr. Luckey. Do you not think it was remarkable for such destruction to be caused by calculus? Have you ever seen such a case before?

Dr. Richards. No, I never have.

Dr. Baker. Do you think it was a wise method of treatment, to chisel off the edge of necrosed bone in that manner?

Dr. Richards. Yes. I once had a case of a young lady where I chiseled off the bone until I got down to white healthy bone, and then let granulation do the rest.

I have another instance, a schoolboy who was brought to me by his mother, having a very offensive breath. Upon examination I found the upper molar black and quite loose. I removed it and found that the ends of the roots were all eaten away. I have taken an impression of that, which I will now hand around.

Dr. W. Moore Gould. Some years ago I had a young man come to me with a case where there seemed to be pus formation. I do not know whether necrosis had set in or not. He did not want to lose the tooth. I syringed it out with pyrozone and ordinary washes and hardly knew whether to leave the tooth in or not, but I did, and continued syringing with pyrozone, giving many treatments, until his mouth seemed to be in a perfectly healthy condition. He went to the war in the Philippines with the tooth still in his mouth, and I have not seen him since.

Dr. Chas. H. Meeker. There are two cases of incidents of office practice which I will mention.

I was bleaching a central incisor for a lady,

using twenty-five per cent. pyrozone, and in using the handglass the patient accidentally knocked off of my bracket table the bottle containing the pyrozone, which fell upon her dress. Knowing that pyrozone is a rapid bleaching agent on wools and similar fabrics, I immediately seized a bottle of alcohol, saturated a napkin with it and wiped off the pyrozone with the alcohol. There were no stains that I could see, no bleaching, and I went on with my work of bleaching the tooth. The sun was shining brightly through my window, and noticing a little smoke I looked down and found the skirt in a blaze. In two or three seconds a hole some three inches in circumference was burned in the dress before I could put it out with my hands. That was not spontaneous combustion, but spontaneous ignition, and just what it was due to I do not know.

Dr. Pruden. Did you light a match during the operation?

Dr. Meeker. There was no flame of any kind whatever, no alcohol lamp or any other during the period of my bleaching.

The other matter I desire to refer to is archite cement. In my experience with it I found it very brittle, and now in using it I take a ground glass slab, put it under the water spout, get it as cool as I can and then mix my cement upon it, and I find that in this way it takes the cement double the time to set. I asked a chemist in New York who is familiar with the use of oxy-chloride and oxy-phosphate; he tried two or three chemical reagents with it, and he said he found it was similar in its composition to the oxy-phosphate cement, and if it could be kept cool that would retard the setting for a long period, and I have used archite successfully since then. I have since heard of a gentleman in New York State who uses bottles containing ice water and an agate burnisher, and who keeps the cement from setting even longer than I have been able to do.

Dr. Richards. I hope the subjects I presented will be discussed a little more fully.

Dr. Pruden. Has the wound entirely closed?

Dr. Richards. Entirely; there is not a particle of opening to it.

Dr. Pruden. That is the first one that I ever heard of.

Dr. Richards. There is an indentation. The reason it closed up may be because I took the precaution of cleaning it out so thoroughly and removing every particle of necrosed bone and spraying out the wound.

Dr. Pruden. I think if it is very closely examined you will find some opening.

Dr. Richards. Is not the bone which I produce the floor of the antrum?

Dr. Pruden. I have no doubt it is.

I am very much surprised that a man should handle a piece of necrosed bone as I saw Dr. Richards do. I should be very loath to take it in my hand like that. I never saw any yet that was safe to handle. I should have looked for trouble in the second molar.

Dr. Richards. I had to take them all out; they were all loose.

Dr. Gregory. Was there any antrum trouble prior to this?

Dr. Richards. There did not seem to be.

It seems to me there must have been some prior trouble; the tartar certainly could not have done all that damage; as I say, I should have looked for trouble about the second molar.

I looked at them to see if they were discolored, and they seemed to be perfectly healthy.

Concerning the subject of archite cement which Dr. Meeker brought up, I have had a good deal of experience with it and have discarded its use, because I found it too brittle. I do not think that retarding the setting by a cool slab will in any way affect the final result. It makes it easier to manipulate and gives one more time, but my experience has been that there is disintegration and a tendency in the material to granulate. I have mixed it with all kinds of spatulas and find a glass spatula is probably the best. But all of those fillings become very brittle after a few months, and I have but little confidence in it.

I have had a good deal of experience with archite and have found the same trouble; it is quite brittle. It almost looks as though it shrunk, although of course we know it does not, but it is not as plastic as some of the other cements on the market. My practice has been to take some other cement and mix it in so as to bring out the color about right, which I think makes it more plastic.

Can we go back to Dr. Richards' case again?

Dr. Luckey. It is a difficult and an unsafe thing to talk about a case on such little data, but I should think the origin of the trouble was some traumatic injury, whether the patient could remember it or not. It certainly was not due to dead teeth. From Dr. Richards' description of all four of these teeth they were not in bad condition. He was not syphilitic, and there is a reason for everything in this world. Tartar does not cause such trouble.

Dr. Richards. That is what surprised me.

It must have been due to a blow at some time in this man's career. Dr. Pruden is right in my judgment when he expresses the belief that this wound

has not healed up and closed entirely. We have had this subject thrashed over before in this society. Dr. Garretson has taken the stand that no injury in the antrum ever closes up, and Dr. Dawborn, at one of our meetings, took the position that they do. In my experience they do not close up, and I am confident that if Dr. Richards would produce his patient some of us would find an opening, and I am also quite confident we would find that there has been no reproduction of bone in that antrum. He has perhaps reduced it to a healthy condition by removing the unhealthy edges; there is no inflammation, and there is no exudation or discharge, and the place has largely healed over, but there is still a minute opening where slight drainage can take place and prevent trouble.

Those cases are not new. This is quite an extreme case, but these cases of the opening of the antrum are not new, and I am fully convinced that where the antrum is completely opened Nature does not close it up entirely.

Dr. Richards. I agree with Dr. Luckey in regard to the antrum not closing up, but it is closed where the tooth came out.

Dr. Fisher. If the opening were small, and if it were cauterized with carbolic acid, would it not heal up?

Dr. Luckey. Dr. Garretson said it would not, and he was perhaps the greatest authority we have ever had in this country on oral surgery. I perhaps would not be justified in passing judgment on that question. I do not know. It is my opinion it would not close up.

Dr. Fisher. I would not say it would close up, but it is strange how carbolic acid will close up an opening. I had a case not long ago with a patient of Dr. Atkinson's. The operation was performed on the mandible; the wisdom tooth and twelfth-year molar were taken out. There was a cyst at the upper place where these teeth had been taken out and I opened it with my lance. The discharge was not disagreeable; it was a kind of a viscid milky color. I cleaned it out thoroughly with several washes and at last with pure carbolic acid. I touched several parts of it with the acid. The place is apparently healed and in a healthy condition on the inside, but the opening is still there.

Dr. Richards. Dr. Gregory said he did not know how I could handle that necrosed bone. I will say it has been in nitric acid and washed out pretty thoroughly.

Dr. Baker. I think this specimen Dr. Richards presents is a very handsome one and a very large specimen of necrosed bone. But it seems to me there must be

something behind the entire trouble, something of a constitutional disorder which has brought about this condition. I should think there was some syphilitic tendency in the patient. He may look healthy, as Dr. Richards says, but his blood should be examined by a specialist.

I had a patient come to me two or three years ago with at least six of her front teeth and the bicuspid on the left very loose; the left superior incisor was at least a thirty-second of an inch shorter than the right incisor, and there was a good deal of odor, but no discharge. I treated it with hydrate sulphide and took out six or seven pieces of bone. There is no doubt about that case being one of a syphilitic tendency, but, as I stated before, I think it would have been no more than proper for Dr. Richards, for his own benefit and that of the members of the society, to have sent the patient to a specialist and had his blood examined, or to have had an examination made by a specialist by some other means.

In regard to Dr. Richards's case, and Dr.

Dr. Cruax. Luckey's remark in connection with it, I quite agree with Dr. Luckey, in one respect, which is that, so far as we are able to judge from the case as Dr. Richards presented it, the trouble is due to an injury of some sort, whether the patient remembers it or not.

As to whether the specimen produced by Dr. Richards is really a piece of necrosed bone or not, I have some doubt; it looks to me like a piece of the process which had been separated by an injury and not united, possibly due to the fact that there was considerable irritation as the result of the presence of salivary calculus.

As to whether or not the openings into the antrum do close, I cannot from my limited experience agree with some of the statements made tonight. I have had several instances varying from the removal of the entire maxillary bone down to all sizes of pieces of bone opening into the antrum, and my difficulty has been to keep them open long enough for proper drainage after the cause or source of the injury has been removed. I find in those cases that, the periosteum being gone, there is no renewal of the growth of bone or the floor of the antrum, but that the space is entirely filled in by new granulation and the antrum thereby closed. I can recall a number of occasions where they have closed, and in one particular instance one that closed of itself within eight or nine months; it was an opening into the antrum through an abscessed molar.

I will refer to a case which is not, perhaps, properly speaking, an incident of office practice, but something which was called to my attention only a few days ago, and which excited my interest and curiosity, and cannot help but be of interest tonight. The patient was a woman of twenty-four years of age and unmarried, who presented herself for treat-

ment for a growth that appeared in the right ovary. She was put under an anæsthetic and an opening made. A tumor was discovered with many adhesions connected with the intestines, the uterus and both ovaries involved, and it was thought for a time that it would be necessary to perform complete hysteromyonectomy. The tumor was removed and on investigation proved to be a dermoid cyst containing a lot of hair, nails, derma, epidermis, sebaceous gland, considerable bone and one perfectly formed tooth.

I understand that this is not unusual, that a dermoid cyst should contain those things, but it is rather curious under the circumstances. We all know that the ovary contains the elements, when fertilized by the spermatozoa of the male, to produce the cells that create the different forms of our anatomy, but in this dermoid cyst we have an evidence of what the ovary may produce unaided, except by the stimulation of disease.

Concerning the case of the school boy, I washed out the cavity with aromatic sulphuric acid and afterwards with a solution of bicarbonate of soda, and it is now in a perfectly healthy condition, having healed up nicely.

Getting back to archite, in my experience it has been a failure, but since giving up the use of it I had a conversation with Dr. Meeker, and he told me his method of using it; but there are many cements on the market from which I can obtain as good results without going to the trouble that Dr. Meeker does.

Through my conversation with other dentists I have been informed that archite is nothing new, that it is an oxide of aluminum with phosphoric acid, and that the same thing was brought out some years ago by various other dental concerns, and culminated in a failure. Probably out of fifty fillings I made with it there are not more than two that satisfy me. It is very brittle, it chips in the cavity, goes to pieces, and it is only a question of two or three months when there is little or no filling left.

Dr. Luckey. How does it stand the fluids in the mouth?

Dr. Baker. It does not seem to disintegrate and wash away; it falls out in large particles.

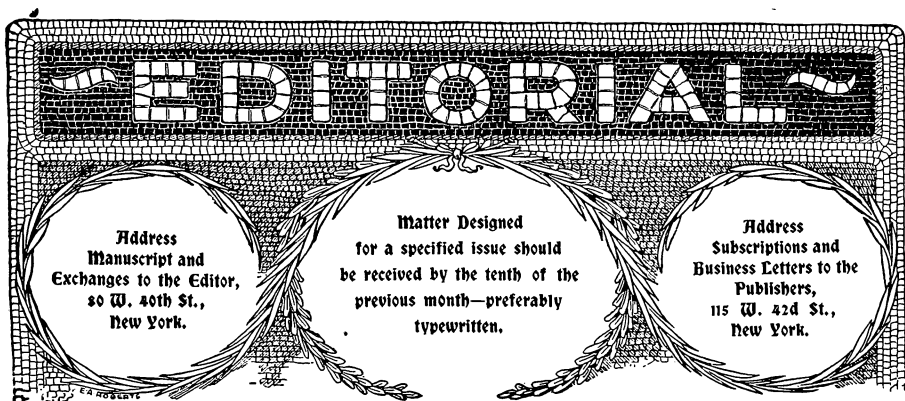
Dr. Fisher. I have used Wilcox's cement, and I think the reason of a good many failures with archite has been that the cavities have not been kept absolutely dry.

In mixing Wilcox's cement every single particle must be thoroughly mixed before any more is added, and I think the failures are often the fault of the operator. I have had some failures, but I have seen some that I am very well pleased with, although I am a little sceptical about it yet.

I have used archite cement for some years, and
Dr. Kane. I think the difficulty arises from the matter of
adhesion. In a cavity with four walls and a very
little surface exposed it will wear for a long time, but in an approximal
cavity I do not think it is to be depended on. It is difficult to scrape off;
almost any other cement but archite comes off quite easily; and I think
the difficulty is altogether a matter of adhesion; not cohesion, but adhesion.

Coming back to the subject of necrosis, I think
Dr. Baker. I have lost a patient. A lady came to me with a
porcelain bridge extending from the right superior
central to the right superior cuspid, which required to be repaired. Upon
examination I found there was a discharge from the place from which
a lateral was extracted, and she told me it had been going on for five
years; that the gentleman who put in the bridge had treated it from time
to time by washing with peroxide, with no results. On further examina-
tion I found the passage extended to the apex of the central root. She
told me the dentist who put the bridge on had filled the root with gold,
but I spent two hours in opening the root and found no gold in it. I
washed it out and used what Dr. Atkinson years ago called "Black Devil,"
a saturated solution of iodine and creosote, and gave her four or five
treatments without noticing any lessening of the discharge. This lady
was a Christian Scientist, and she said to me: "Doctor, I can cure this
by Christian Science." I smiled and was somewhat amused. She said:
"You need not laugh; science has done wonderful works." I said I was
not laughing at her, but that I thought there was a necrosed bone at the
end of the root, and that if she could cure the discharge I would be more
than pleased to have her do so; that if she would go to her healer, have
that cured and come back I would put the bridge in. She said she had
spoken to Mrs. Lathrop, the healer of her church, who told her she had
no doubt she could cure it, but would not undertake it as long as any
material means were being used. I told her I would stop right there so
that she might go to the healer and be cured. She said she would go and
come back again, but I have not seen her since, and it may be of advan-
tage to you if you have a case of that kind, not to turn it over to Christian
Scientists. If you cannot treat it to your own satisfaction, have it
extracted and put in the bridge.





“Will You Walk Into My Parlor, Said The Spider To The Fly?”

In the June issue of *ITEMS OF INTEREST* a little trap was set for Dr. Crouse, and it is highly amusing to note the innocence with which he has walked right in. Now this trap was very carefully prepared; the language was chosen with the utmost caution; it was needful neither to say too much nor too little, for it was a wary old bird we aimed to catch: yet we caught it. Here is the way in which Dr. Crouse has permitted us to find him napping. The following is an editorial in the June number of the *Digest*, and the aforementioned trap is the quotation in the first paragraph:

BLINDED BY CONCEIT.

In the June *ITEMS OF INTEREST* appears this editorial squib: “The editor of the *Digest* apparently has devoted so much of his time fighting patents that he has overlooked the copyright laws entirely. In the March number of the *Digest*, among the ‘Original Communications,’ appears an article entitled ‘Tin—A Plea for More Conservative Methods in Filling Teeth,’ by Dr. T. D. Shumway, Plymouth, Mass. This paper was first published in *ITEMS OF INTEREST* and was copyrighted. The *Digest* has not only republished the matter, but has done the author the injustice of omitting the copyright claim.”

The facts in the case are as follows: Dr. Shumway first read his article before the Harvard Odontological Society, Dec. 27, 1900, and it was first published in the July, 1901, issue of the *International*. When reading it before the Harvard O. S., Dr. Shumway reserved the right to present it to the Vermont State Dental Society at its coming meeting, and he therefore read it before that body March 21, 1901. The Society voted its papers to the *Digest* for publication, with the provision that we were

to furnish copies to the *ITEMS*. It was some time before the secretary turned over the papers to us, and a still further delay was caused by the failure of some essayists to forward their papers, but when they were finally all in hand we took copies and sent the originals to the editor of the *ITEMS*, as per the request of the Society. Under date of November 7, 1901, Dr. Ottolengui wrote: "I have retained Dr. Shumway's paper, the others not being available for publication in *ITEMS OF INTEREST*. They are therefore returned to you."

Dr. Ottolengui now states that Dr. Shumway's article "was first published in *ITEMS OF INTEREST*." The facts are that it was published in the March, 1902, number of the *ITEMS* and in the March, 1902, issue of the *Digest*, and instead of this journal having "republished the matter," it was through our courtesy that Dr. Ottolengui received the original of the article before it was published in the *Digest*.

In responding to a toast at the annual banquet of the Central Dental Association of Northern New Jersey last February, Dr. Ottolengui said: "I think the only journal of any consequence whose editor is not a professor is *ITEMS OF INTEREST*." We cannot believe that Dr. Ottolengui wilfully or maliciously misstated the facts about Dr. Shumway's paper, but in view of the above remarks it is plain that he has become so blinded by conceit that he imagines the dental world revolves around him and his journal. In all kindness we would recommend to him a careful reading of Æsop's fable—"The Frog and the Ox."

Now there is really a good deal of humor in this situation, if one be appreciative of humor. Indeed there are so many little jokes that we must crack them one at a time. One argument brought forth by Dr. Crouse seems to be that he could not have copied Dr. Shumway's article from *ITEMS OF INTEREST*, because it appeared in the *March* issues of both journals. And yet in his *June* issue he is replying to and quoting from our *June* issue. Really we had thought Dr. Crouse more wary. We are replying to his *June* editorial in our *August* number, because his *June* number reached us on *July* 2. In similar manner his *March* number came out weeks after ours.

The second joke brings out one of the secret springs of the trap. If the *Digest* used original manuscript in publishing Dr. Shumway's article, and did not copy from *ITEMS OF INTEREST*, how does it happen that all our box headings appeared as side headlines in the *Digest*? Telepathy, probably.

The third joke is that Dr. Crouse was so intent on getting off a little personal fling that he really does not reply to the main charge. Observe that we say the language was carefully selected. We expressed it thus: "The paper was first published in the *ITEMS OF INTEREST*, and

was copyrighted. The *Digest* has not only republished the matter, but has done the author the injustice of omitting the copyright claim." Read carefully, it will be seen that we are making no complaint on our own score. We simply state the fact that the paper was published first in our magazine. This is true. Also that the *Digest* omitted the copyright claim of the author. This also is true, and unnoticed in the *Digest* editorial. Now the humor of this is seen when we remind Dr. Crouse that this paper was not copyrighted by us, but by Dr. Shumway, and that the claim was on the original manuscript, which he leads us to believe served them as copy.

The last joke is not of our creation, but is the funniest of all. Dr. Crouse quotes from an after dinner speech a statement which he takes seriously, but which at the time was launched as a jest, and which met the usual reception of a jest—laughter. But Dr. Crouse takes it seriously, because perhaps by analyzing the statement that "the only journal of *any consequence*, etc.," it now appears that the *Digest* was overlooked. But really this was not intended at all. The *Digest* was simply forgotten.

Now let us leave jokes, and come down to facts. Dr. Crouse says the paper of Dr. Shumway came to us through his courtesy. Let us see just how burdensome this courtesy was. Prior to the meeting of the Vermont State Society, we had been led to expect that the papers would come to us. After the meeting we were told that the *Digest* had made application for them, and that the Society had voted them jointly to the two magazines, *ITEMS OF INTEREST* and the *Digest*. Their transmissal to us by the *Digest* therefore became a matter of duty rather than courtesy. On or about May 1 a letter reached us from the *Digest* explaining the situation, and stating that the papers would be forwarded to us as received. To this we replied:

"I thank you for promising to send me the other papers, but it would be unnecessary for you to do so, as we could not use Society papers *which are published in another magazine.*"

To this we received the following answer:

"The idea of the Vermont State Dental Society was evidently to have the papers appear in *ITEMS* and *Digest* simultaneously, but if it is contrary to your custom the matter of course will have to be dropped."

This was in May. Later we received a letter dated Oct. 21st, repeating

the fact that the Vermont Society voted the papers to both journals for simultaneous appearance, and announcing that three of the papers had been forwarded to us. Then the writer continues:

"Just at present the *Digest* is so rushed with Illinois State and the National papers and proceedings, as well as a lot of other manuscripts which we have on hand, that we do not see our way clear to publish these three papers for some time, so think best to forward them to you for use in the *ITEMS*, if you so elect."

These letters are facts, not theories. They show that we refused to publish matter simultaneously with the *Digest*, and that subsequently the *Digest* sent the papers to us unconditionally.

Presumably, at the time of the Vermont meeting, the *Digest* was looking for manuscript. Then at the National meeting Dr. Crouse, member of the executive committee, obtained the publication of the National proceedings, for Dr. Crouse, editor. Unused to such a plethora of original material, they regretted their agreement with the Vermont Society, and gladly (not from courtesy) sent the poor little manuscripts hunting a publisher. But *ITEMS OF INTEREST* also had a sufficiency of material, and declined all except Dr. Shumway's, which was retained for publication because it chanced that certain correspondents were asking for information in regard to tin and gold. By the time we found room for the article, the tide of manuscripts at the *Digest* office apparently had fallen again, and so perhaps it was convenient to utilize what had been given up.

Yet again, be it said, we made and make no complaint. We understand fully that the *Digest* depends mainly upon a pair of scissors for its matter. Indeed its name implies this. We simply pointed out the omission in regard to the copyright claim. But since Dr. Crouse takes a little joke so seriously we are obliged to label the jest and explain the points of it.





National Society Meetings.

American Society of Orthodontists, Philadelphia, Pa., Oct. 8, 9, 10.

State Society Meetings.

Canadian Dental Association, Montreal, Sept. 16, 17, 18.
District of Columbia Dental Society, Washington, Dec. 16.
Minnesota State Dental Association, St. Paul, Sept. 1, 2, 3.
Nova Scotia Dental Association, Truro, Sept. 23, 24.
Northern Iowa Dental Society, Sept. 2, 3, 4.
Northeastern Dental Association, Worcester, Mass., Oct. 15, 16, 17.
Ohio State Dental Society, Columbus, Dec. 2, 3, 4.
Virginia State Dental Association, Old Point Comfort, Aug. 5, 6, 7.

The Colorado State Dental Association.

At the sixteenth annual meeting of the Colorado State Dental Association, held in the Alta Vista Hotel, Colorado Springs, June 17, 18 and 19, the following officers were elected for the ensuing year: President, H. B. Hayden, Colorado Springs; vice-president, E. W. Varley, Pueblo; secretary, W. A. Brierley, Denver; treasurer, Wm. Smedley, Denver. The candidates elected for appointment by the Governor on the State Board of Dental Examiners were: W. H. Hall, Denver; H. F. Hoffman, Denver; M. H. Smith, Denver; Theodore Ashley, Cannon City; Geo. R. Warner, Grand Junction.

The next meeting will be held in Pueblo, June 16, 17 and 18, 1902.
W. A. BRIERLEY, Secretary.

70 Barth Block, Denver, Colorado.